

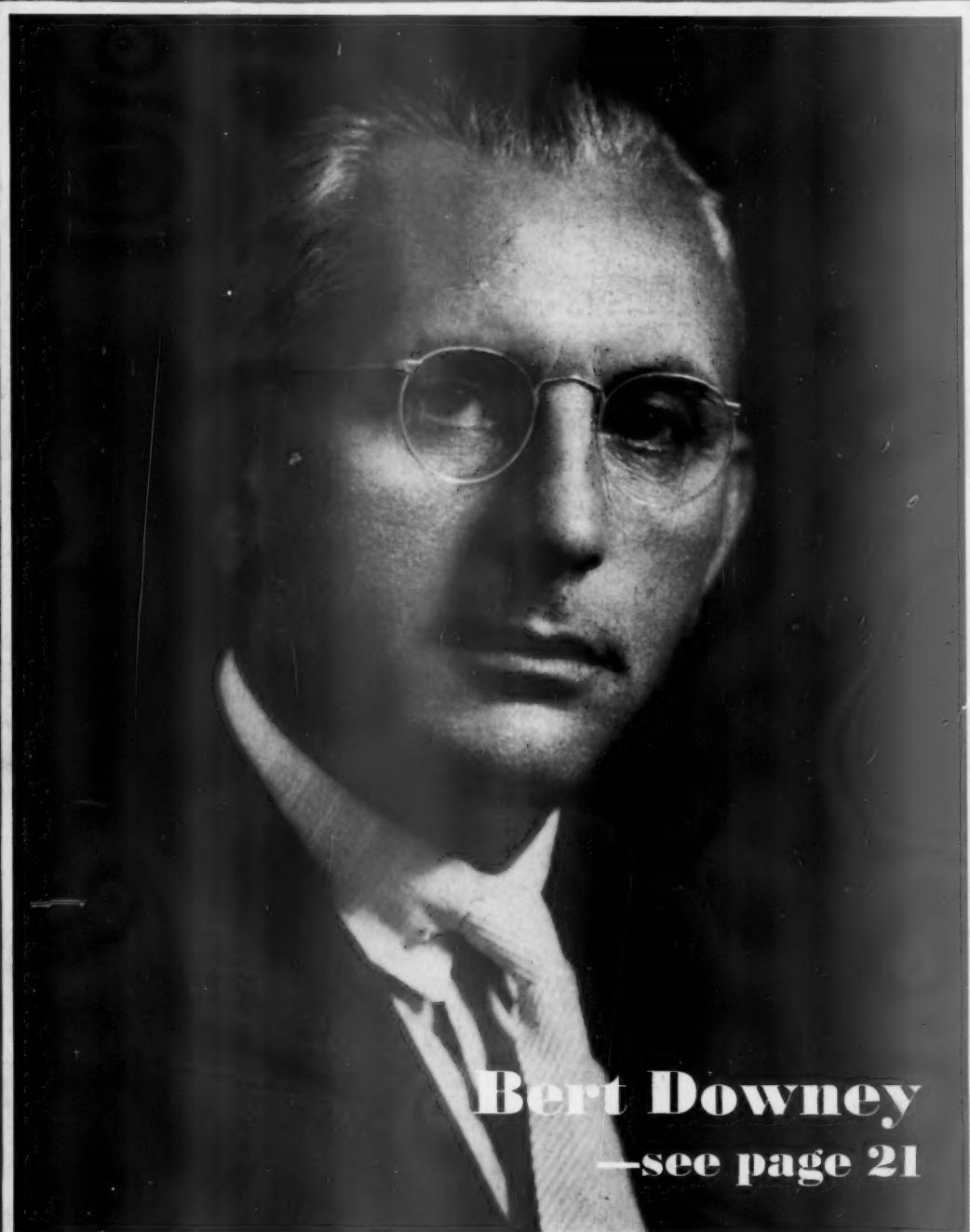
TECHNOLOGY DEPT.

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# PURCHASING

CONSOLIDATED WITH • *The Executive PURCHASER*



JANUARY 1938

Vol. VI No. 1



FRIENDSHIP

can't be bought

Friendship is something that grows. It may be born by some slight service. It increases through giving more than is expected—those extra details which, though apparently of little importance at the time, mean so much in the end. But friendship can't be bought.

Republic and its subsidiaries count as friends thousands and thousands who use their products—the man in the shop, the salesman, the operating executive and the purchasing agent. Through experience these men have become well acquainted with Republic quality and dependability—with Republic's metallurgical service—and with Republic's attention to details that make good steels and steel products better.

Republic is proud of its many friends—and promises to carry on in the production of better steels that will justify the continued friendship of its customers—that will make life more livable for the purchasing agent.

*Republic Steel*  
Corporation

AND SUBSIDIARIES  
GENERAL OFFICES . . . CLEVELAND, OHIO

BERGER MANUFACTURING DIVISION  
UNION DRAWN STEEL DIVISION  
NILES STEEL PRODUCTS COMPANY  
STEEL AND TUBES, INCORPORATED  
TRUSCON STEEL COMPANY

When writing Republic Steel Corp. (or Steel and Tubes, Inc.) for further information, please address Department EP



## IT FLOATS THROUGH THE HOSE WITH THE GREATEST OF EASE

*A typical example of Goodrich improvement in rubber*

UNLOADING a car of cement or any such bulk material used to require an expensive gang of laborers, who had to sweat and strain with heavy bags which cost money to make and fill, and more money to handle. A machinery manufacturer, searching for a more efficient way, invented a machine to do the work.

Propelled, under its own power, into a car of bulk material (no expensive bags necessary) this hungry little machine picks up cement on a revolving disk, passes it through a "pusher" screw into the hose. The cement isn't blown through with strong air currents; just

enough air is drawn in to cushion each cement particle and let it float or be pushed along like a liquid.

A large hose was needed, so light the machine could pull it around easily yet one that couldn't kink or flatten out at sharp corners. A new problem for Goodrich but solved in the same way, by the same technical men, who each year make improvements in water hose, air hose, fire hose, conveyor belts and hundreds of other industrial rubber products.

When you buy Goodrich rubber rolls, tank linings, belting, packing—you are buying products of this same Goodrich

research which is constantly at work to develop new products for industry and make standard products better. No wonder Goodrich products keep your plant efficiency high, maintenance costs low. For greater value in the rubber products you buy, see your Goodrich distributor. Write us for his name if you don't know him. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

**Goodrich**  
*ALL products problems IN RUBBER*

(Another story of Goodrich development work appears on inside back cover page)

# PURCHASING

*Established 1916 as "The Purchasing Agent"  
Consolidated with "The Executive Purchaser"*

**PURCHASING** is an independent journal, not the official organ of any association. It is the only publication of national scope devoted exclusively to the interests and problems of the purchasing executive in industry and government.

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NUMBER 1

PAGE 2

January 1938

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PURCHASING



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# ***Yours on Request***

Purchasing agents will find it well worth their while to read the publications reviewed on this and the following pages. From among the many submitted to us, they have been selected by the editors as having greatest interest and utility value to purchasing agents.

To obtain copies, simply fill in and mail coupon at the bottom of this page.

**230.** How to save money on intra-plant and industrial hauling and to lower costs and speed up plant operations by using the proper rubber-tired wheels on material handling equipment is told in the B. F. Goodrich Co.'s new 30-page Industrial Tire Handbook. Of particular interest to purchasing agents are descriptions of tests showing how rubber-tired equipment can reduce abrasive wear on floors, and charts explaining why rubber tires require less power.

**232.** An interesting pamphlet entitled "Make That Deadline" has been issued by Railway Express Agency defining rates applying to the shipment of various classes of printed and advertising matter, including catalogs, merchandise samples, display material, circulars, calendars, signs, etc.

**240.** A new Bemis & Call folder features six wrenches which cover a wide range of industrial uses. The models illustrated are knife-handle, steel-handle, adjustable "S" Nut, combination pipe and nut, steel-handle monkey, and monkey.

**249.** Every dollar you spend for lighting is divided as follows: Current 90%—Lamps 10%, according to "They Stay Brighter Longer," informative new booklet issued by the General Electric Co. With an abundance of illustrations and limited but pointed text, this booklet portrays the construction of lamps and tells what to look for when buying lamps. One of the numerous features of this publication is a list of defects for which mazda lamps are inspected.

**253.** In addition to mail, parcel post and express scales of various types, an extensive line of automatic and beam scales for countless industrial applications is illustrated and described in the Triner Sales Co.'s complete catalog. Custom-built models and dials to meet particular requirements are available, as are standard models for every need imaginable.

**258.** "The Candid Camera Tells the Story" is the title of an illuminating pamphlet portraying the various steps in the manufacture of Parker-Kalon Socket Screws. In addition to the numerous candid camera shots which accompany the text, the pamphlet features tables showing dimensions, specifications and prices of cold-forged hollow set screws, socket head cap screws, socket head stripper bolts and hex wrenches.

**274.** Thirteen different models of improved office type fasteners are illustrated in an attractive new catalog insert sheet now being issued by the Markwell Mfg. Co. as a supplement to its extensive line of stapling devices.

**PURCHASING**, 11 West 42nd St., New York, N. Y.

I wish to receive the following literature:

Numbers: \_\_\_\_\_

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

PAGE 4

**275.** The Neenah Portfolio of rag content papers, containing samples of bond, ledger and manifold papers, describes the visible and invisible factors which affect paper quality. Of special interest is the insert entitled "The Letterhead Question—and a few answers," which deals with the various attributes of a good letterhead.

**276.** The Ryerson Certified Steel Book—a beautifully illustrated 28-page, 11" x 15", spiral plastic bound publication published by Joseph T. Ryerson & Son, Inc.—explains in detail how certified steels solve the problem of obtaining uniform and quality controlled steel for immediate shipment from stock. Of definite value to all users of steel, especially those interested in alloys, this fine book is a definite asset to every purchasing department. It includes specifications for an extensive variety of steels and alloys, in sheets, bars, strip, plates, structural shapes, etc.

**277.** The Aluminum Paint Manual, published by the Aluminum Company of America, contains 104 pages of valuable information on the subject of aluminum paint. Among the topics treated are characteristics of aluminum paint, pigments and vehicles for aluminum paint, testing, methods of application, directions for use on various types of surfaces, etc. Concluding the book is a chart of swatches showing finishes available.

**278.** *✓* Bound in a gold and silver embossed leather cover is the Pyle-National Co.'s 46-page, 8 $\frac{1}{2}$ " x 11", Floodlight Catalog No. 211. This loose-leaf publication details specifications and prices for many types of floodlights and accessories for a wide range of industrial applications as well as for such general purposes as airport and athletic field lighting.

**279.** *✓* "Moore's Modern Methods," a 144-page, 10" x 6", book published by the John C. Moore Corp., illustrates standard loose-leaf systems, binders, indexes, cabinets and innumerable stock forms. Among the latter are purchasing agents' records, production cost sheets, employee and social security records, advertising return sheets, follow-up freight claims, quotations given and received, stock on hand, etc. Special ruled and printed forms to fit individual requirements are also available.

**280.** Numerous actual photographs of bulkbound car-load shipments of many diversified products tell the story of "The Signode Tensional Steel Strapping System for Carloading," a booklet published by Signode Steel Strapping Co. Savings in freight costs and shipping materials, reduction of packing time, increased safety in transit are included among the claims made for this system, which is used by many leading manufacturers.

**281.** An 8-page, 8 $\frac{1}{2}$ " x 11", folder illustrates and describes the A. Schrader's Son's line of industrial products for use in plants having compressed air equipment. Included are blow valve and blow gun equipment, couplers for airlines and pneumatic tools, hydraulic pressure gauges, press safety control, etc.

**282.** The new Truck Caster Catalog K-25-B, issued by Bond Foundry & Machine Co., devotes 40, 8 $\frac{1}{2}$ " x 11", pages to a comprehensive line of wheels and casters. In addition to detailed specifications and prices, this catalog contains important information and engineering data of service in planning equipment requiring truck casters.

**283.** An interesting catalog prepared by Abrasive Products, Inc. combines a presentation of its line of Coated Abrasive Papers and Cloths with a description of manufacturing operations, amply illustrated. Represented in the 40, 5 $\frac{1}{4}$ " x 8", pages are special abrasives for metal working, wood working, leather working, etc., in rolls, sheets and belts.

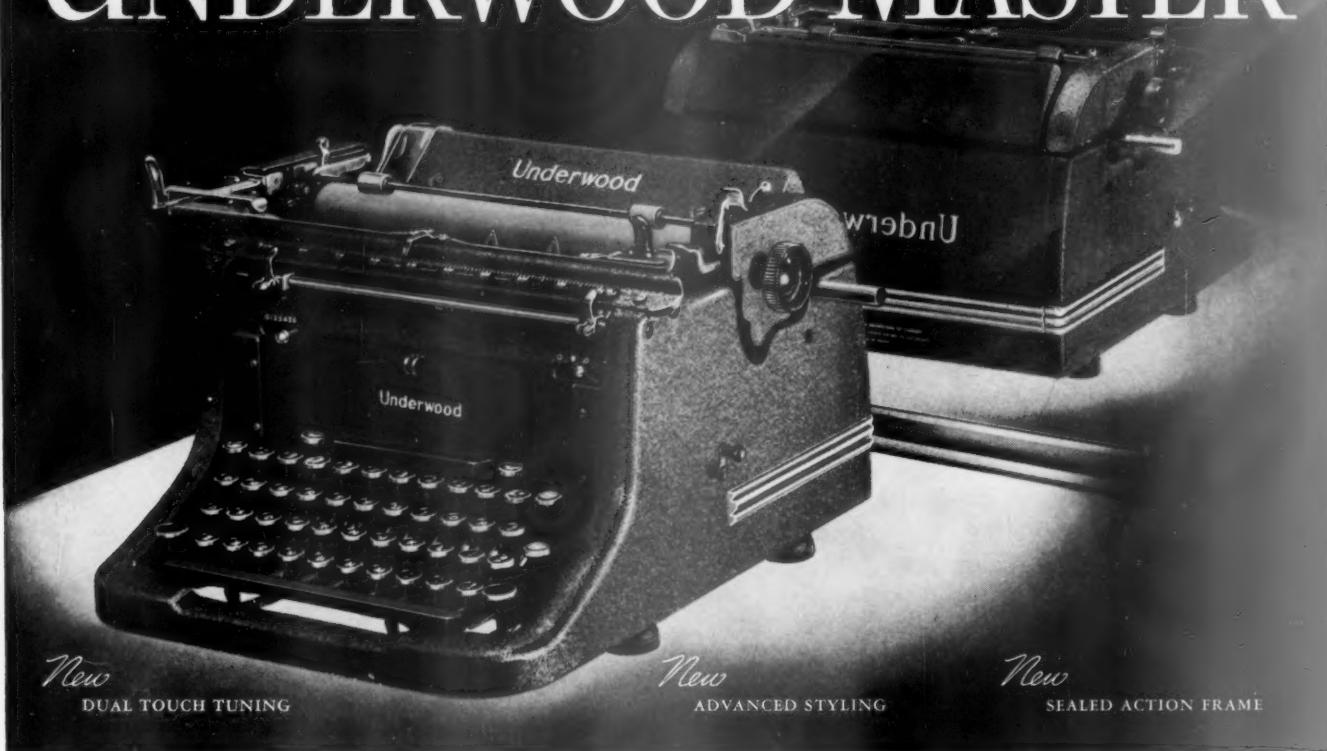
(Additional listings on page 6)

PURCHASING

*Underwood*  
Offers Business  
a Choice of 3... (1) THE STANDARD... (2) THE NOISELESS...



*and now...the New*  
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of each key to the finger tips; the other, keyboard controlled, varies the tension of all keys at the will of the operator...The new Underwood Master offers a completely sealed back, providing maximum protection against dust and assures even quieter operation. Typing visibility is 100 per cent complete...See the new Underwood Master. Check its exclusive features point by point. Note how its general performance has been placed on a new and higher standard. Then remember that the Master is one of



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**WORLD'S LARGEST MANUFACTURER OF TYPEWRITERS**

## ***Yours on Request***

Purchasing agents will find it well worth their while to read the publications reviewed on this and the following pages. From among the many submitted to us, they have been selected by the editors as having greatest interest and utility value to purchasing agents.

To obtain copies, simply fill in and mail coupon at the bottom of this page.

**284.** 25 "fundamental" types of corrugated shipping boxes are briefly described and illustrated in "How to Pack It," a brochure published by The Hinde & Dauch Paper Co. This booklet notes the most important construction features of boxes especially designed for such widely varying types of merchandise as books and beer, fruits and photographs, grinding wheels and groceries, etc.

**285.** A pictorial and descriptive story of how various types of steel products are manufactured features the Youngstown Sheet & Tube Co.'s. 115-page, 5 $\frac{1}{4}$ " x 8", leather covered loose-leaf book, "What We Make and How We Make It." An introductory section of this publication presents an extensive line of steel pipe, tubing, sheets, plates, bars, rods, shapes, wire, nails, water-well supplies, unions, conduit.

**286.** A new bulletin recently completed by The Bristol Co. is devoted to steel belt lacing products. This bulletin, No. 728, contains application information regarding the various styles and sizes available, with prices listed.

**287.** One of the interesting features of a new booklet prepared by National Blank Book Co. is the comparison between regular white paper and green-white "Eye-Ease" paper. This booklet describes the many advantages of the new "Eye-Ease" records, which reduce eye-strain and fatigue and promote accuracy.

**288.** "Safe Handling of Acids and Chemicals," a new folder published by Pulmosan Safety Equipment Corp., illustrates and describes safety equipment designed to prevent accidents and eliminate health hazards associated with the handling of acids and chemicals. Among the items shown are carboy truck, carboy tilter, carboy drainer, aprons, gloves, goggles, respirators, hoods, skin protectives, acid-proof pails and dippers.

**289.** "Fact is Sounder Than Fiction" is the title of an interesting 28-page booklet describing the facilities of the Electrical Testing Laboratories. Among the numerous testing laboratories maintained by this organization to evaluate products and equipment are electrical, mechanical, photometric, paper, research, radio, chemical, incandescent lamp, cable, high voltage, refrigeration, appliance, rubber insulating equipment, air conditioning, etc. All are covered in this booklet.

**290.** An analysis of the standards by which buyers of incandescent lamps can measure the true cost of light is presented in "How to Judge A Lamp," a 16-page, 8 $\frac{1}{2}$ " x 11", booklet published by the Westinghouse Lamp Co. Concluding that the controlling factor in the cost of light equation is the lamp, the booklet proceeds to show how to judge lamp quality. Interesting charts and illustrations enliven the text.

**PURCHASING, 11 West 42nd St., New York, N. Y.**

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Numbers: \_\_\_\_\_

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PAGE 6

**291.** The applications for Laminum Shims in the aviation industry for securing exact precision, both in original assembly and in service adjustments, are illustrated and described in a new bulletin. The aircraft industry is cited as one of many employing these shims as standard equipment for bearings, gear and other assemblies.

**292.** "Stic-Tite" plastic insulation cement is the subject of a folder issued by Refractory & Insulation Corp. A general heat insulation for every industrial service, "Stic-Tite" is easily reclaimable for re-use, offers coverage of at least 50 square feet, one inch thick, per 100 lbs. when dry, resulting in lowest cost on the basis of material, labor, service life and insulating efficiency.

**293.** Known for years as Initial Index, the Rising Paper Co.'s 50% rag index bristol has been renamed Finance Index. A new sample folder just issued demonstrates the improvement in quality, changes in colors and additions of new weights. Of the nine samples in the folder, four are new shades.

**294.** A 100-page book entitled "Chemical & Biological Laboratory Instruments" is announced by the American Instrument Co. Designated as Catalog No. 38PU, it presents information on the latest developments in scientific instruments.

**295.** To show the various excellent points of construction of its line of "Appco" envelopes, the American Paper Products Co. has issued a new Sample Folder. The folder contains samples of some of the more popular styles and sizes represented in this manufacturer's complete line of commercial envelopes. Included are standard, window and "pennysaver" types.

**296.** The De Vilbiss Co.'s new 48-page, 8 $\frac{1}{2}$ " x 11", Catalog DF covers complete spray painting equipment for exterior and interior painting, product finishing, automobile refinishing, etc. Portable and stationary outfits, a complete line of spray guns and all accessories required in connection with spray painting are shown, as are many specialty items.

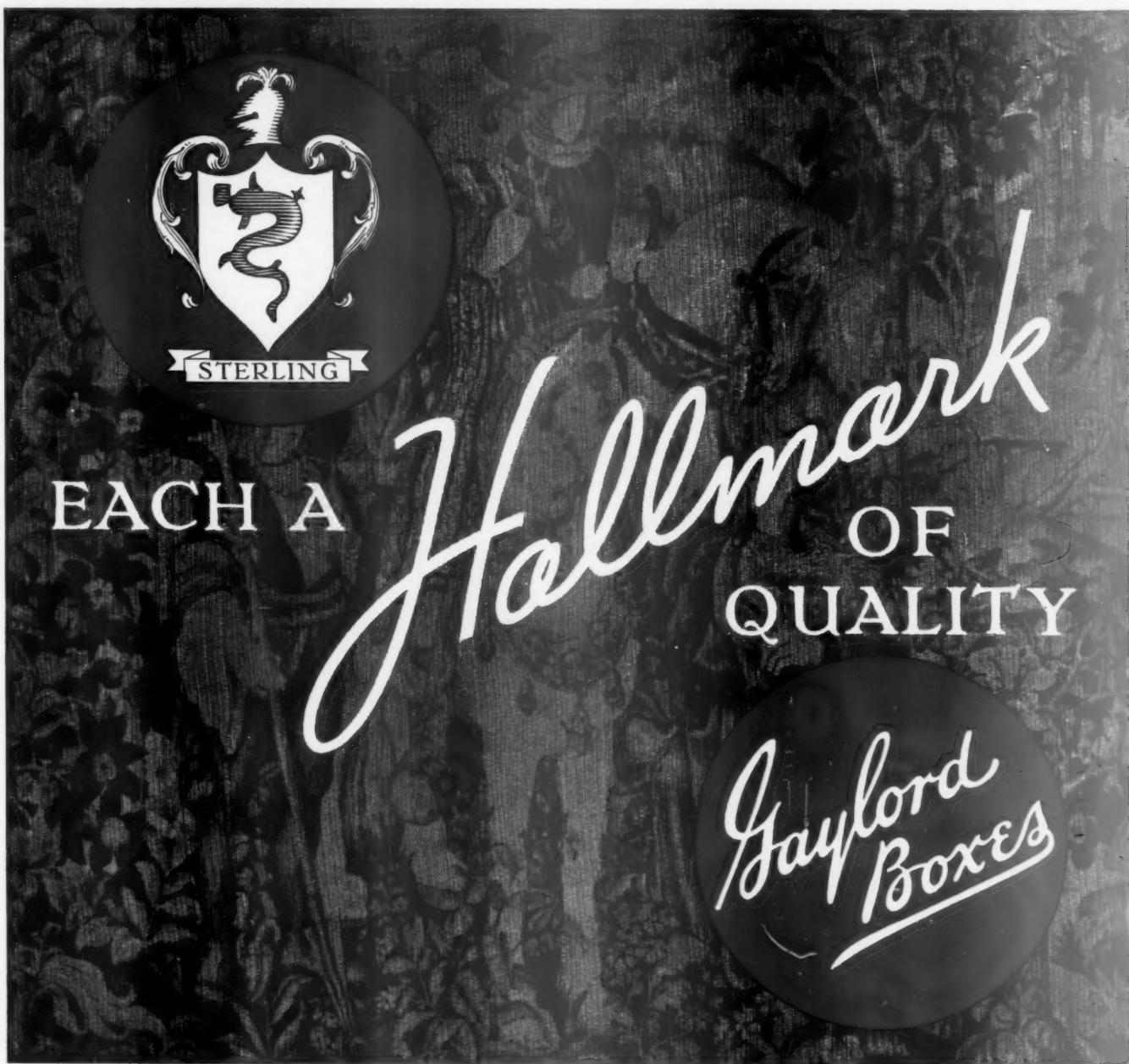
**297.** New patented "Speed-Mo" time and date stamps are offered on approval in a pamphlet issued by Rivet-O Mfg. Co. In addition to numerous stock styles (such as Received, Paid, Approved, Filed, etc.) these stamps are available with any special wording desired.

**298.** A colorful 24-page, 8 $\frac{1}{2}$ " x 11", folder, explaining its process for solvent degreasing of metal parts and illustrating its line of solvent degreasing machines, has been prepared by G. S. Blakeslee & Co. Positive cleaning, speed, economy, simplicity, and elimination of drying, rejects and fire hazards are claimed for this process. Also described in the folder is Blacosolv degreasing solvent and its properties.

**299.** A virtual encyclopedia of rock drills and associated equipment, including jackhammers, paving breakers, drifters, stopehammers, wagon drills, jackbits, drill steel, sharpeners, furnaces and blacksmith equipment such as jackrod threading devices, calyx and diamond drills, and accessories is presented in a new catalog, No. 4201, by Ingersoll-Rand Co. The 80-page, 8 $\frac{1}{2}$ " x 11", volume is profusely illustrated with installation and shop views, and includes eight pages of useful tables and engineering data.

(Additional listings on page 4)

PURCHASING



In the world of silver, "Sterling" denotes a quality unequalled in ageless service. By dint of actual performance, Gaylord Boxes, with their "Extra Margin of Safety," have earned the same high regard in the shipping container world.

Check with Gaylord . . . there's a plant or sales office in your territory.

## **GAYLORD CONTAINER CORPORATION**

General Offices: SAINT LOUIS

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# **COMMODITY PRICES**

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*--in--*

# 1938

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**WHY NOT** make inquiry about the McGill Commodity Service which is now providing industrial and commercial organizations throughout the country with dependable price analyses and forecasts?

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In 1937  
More Royals were sold  
than ever before!



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THE DESK TEST\*

HELPED MAKE THE GREATEST  
YEAR IN ROYAL HISTORY!!!

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**WORLD'S NO. 1 TYPEWRITER**



## NOTHING WIPES LIKE A GOOD WIPIING RAG!

Users of industrial wipers occasionally, for one reason or another, are induced to "try out" some substitute for washed rags. Promises made for these allegedly "just as good" substitutes are soon discovered to be groundless. Shortly, the experimenter finds for himself that "nothing wipes like a good wiping rag."

But the rag should be more than "just a rag." It should be a *rag-plus*—Plus the warranties that go with all Institute Labelled wipers. These are (1) Sterilization (2) Correct weight (3) Uniform Specification Packing (4) Made in America, and (5) Fair Dealing. For *Rags Plus*—deal with an Institute Member. Demand the Sanitary Institute Label on Every Bale.

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BROOKLYN, N. Y.—Delia Waste Products Corp., 1557-61 Dean St.  
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CHICAGO, ILL.—Central Mills Co., 3920-60 S. Loomis St.  
CHICAGO, ILL.—Chicago Sanitary Rag Co., 2137 S. Loomis St.  
CLEVELAND, OHIO—Mansco Corp., 3524 East 74th St.  
CLEVELAND, OHIO—Wiping Materials, Inc., Room 216-1836 Euclid Ave., W. H. Martin, Rep.  
HAMILTON, OHIO—Philip Carey Mfg. Co., Leshner Division, 1240 Central Ave.  
PITTSBURGH, PA.—Armstrong Sanitary Wipers Co., 1233 Spring Garden Ave., N. S.  
PITTSBURGH, PA.—Wiping Materials, Inc., 320 Empire Bldg., J. M. Evans, Rep.  
PITTSBURGH, PA.—Scheinman-Neaman Co., 1024 Vickroy St.  
ST. LOUIS, MO.—Wiping Materials, Inc., 2000-28 N. Main St.

*For complete Institute specifications write any member or  
The Sanitary Institute of America, 10 S. LaSalle St., Chicago*

# Mail

## Color Standards, Morale, etc.

To the Editor:

In the December issue, Mr. L. F. Robbins' comments on "Specifications for Paper" aroused my interest.

The color standardization he suggests would relieve buyers of many small gripping pains if it could be accomplished. My own feeling is that it may be quite impossible for considerable time to come, if ever. But then, I also feel that "he-who-must-have-colored-forms should put up with what he gets." I have troubles enough trying to get a white that *is* white without desire to particularly cater to those in our organization who insist that they must have color to distinguish one form, or copy from another. If the user cannot read the copy label, I maintain he will pay no attention to color.

If Mr. Robbins will work back along to the seat of his difficulty he will find interesting factors. Buyers of advertising use larger quantities, and are more vociferous in their demands on the mill than the buyer of record papers. They continually have in mind "hitting their prospect in the eye" with copy, with illustration, with type, and with paper. Hence the ultimate user will continue to be a live prospect for bigger and stronger lenses in his glasses. My one hope is that they will not develop color in paper to the extent that color in women's stockings has been developed (?).

Artists have little agreement among themselves on color nomenclature. Printers have reams on color in inks. I have been in the library of a printing plant and looked through a most elaborate book of colors with innumerable shades and tones illustrated and numbered. I believe it was published in Germany. It is a lovely book, but little used. Chemical progress in color synthesis keeps the paper mill superintendent "humping" to maintain what uniformity he is able to achieve at present. Consider, too, even the water used in a mill, varying as it does from season to season, year to year, and location to location, affects the color values of each dye. The raw materials vary greatly in color, which must first be bleached out and then corrected to standard by adding dye. Whether he uses wood or rag in his paper, and regardless of how "choosy" he may be in selecting raw materials, there is just enough variety to make a pain in the neck to the mill super.

Lighting engineers will have to give us uniform lighting both at the source of the paper and at the users' desks. They haven't yet reached that stage, to my knowledge.

**FIDELITY ONION SKIN**  
100% RAG  
Made in White Only. Substance 7½ and 9  
Cackle, Smooth and Glazed Finishes.

**EMCO ONION SKIN**  
100% RAG  
Made in White and eight Colors. Substance 10  
Cackle and Glazed Finishes.

**SUPERIOR MANIFOLD**  
25% RAG  
Made in White and nine colors. Substance 8  
Cackle and Smooth Finishes.

**YOU CAN DEPEND ON**  
**ESLEECK**  
**THIN PAPERS**

We Recommend them for •  
THIN LETTERHEADS, RECORDS, COPIES,  
FOLDS, ADVERTISING FOLDERS,  
IDEAL FOR AIR MAIL, BRANCH OFFICE,  
FOREIGN CORRESPONDENCE, ETC.  
• SEND FOR SAMPLES

ESLEECK MANUFACTURING COMPANY  
TURNERS FALLS, MASSACHUSETTS

Under the circumstances, I believe, we buyers of paper will have to let this color uniformity idea lie on the shelf for a long time yet.

To change the subject, I'd be much more inclined to follow the suggestions of "Sales Manager" writing on the P.A. and industrial morale, if I could be sure that he was not the gentleman who came to see me early this year and suggested that I load up to the roof of the stock room with a nice inventory to enable the making of a fat speculative profit during this year. As I remember it, a number of the boys interested in the reading of their order books prophesied, early this year, great difficulty in getting the materials I would need: strikes, wage increases, traffic difficulties increased costs because of inflation, and a number of other difficulties. Any sales manager who expects to sell me a year's supply of material, for example, can hardly expect me to be in the market again until I have used up at least a reasonable quantity, say nine months of it.

Fortunately for myself, management is not after a speculative profit. And a few of the vendors admitted that they would do their darnedest to keep me going. At the moment we are buying, and business here I think is going on as usual, with no help laid off. But then, we are an excep-

tion to the rule. Many told us that during 1931, 1932 and 1933. From my side, it looks as though our management had formulated sound policies and stuck to them. But then again, I may have too high an opinion of the people I work for.

Anyway, the Season's greetings to your correspondents and yourselves. Maybe we are all doing a fairly good job, at that.

Cordially,

A.

Chicago, Illinois  
December 18, 1937

T. O. EDWARDS has resigned as purchasing agent for the Castalia Portland Cement Co. to become superintendent of the Diamond Fertilizer Co., Sandusky, Ohio.

JAMES H. LOCKHART, Purchasing Agent for the Tampa (Fla.) School District, has been appointed by Governor Cone to serve on the first Jury Commission of Hillsborough County under the provisions enacted by the 1937 legislature. Mr. Lockhart's term will expire in January, 1939.

NORTON ABRASIVES

NORTON CUT-OFF WHEELS

Variety—in abrasives and bond—that's one reason for Norton success in every cut-off operation.

Expert Service is another reason—experts who can help you adapt these wheels to your job.

Abrasive wheels are now recognized production tools for cutting-off and slotting operations—are doing the job more economically than other methods and leaving a finish that, in many cases, eliminates subsequent operations. Let Norton show what they can do for you.

NORTON COMPANY, WORCESTER, MASS.

ALUNDUM AND CRYSTOLON ABRASIVES  
RESINOID, RUBBER AND SHELLAC BONDS

# IT'S WHAT'S INSIDE THAT COUNTS!



"X-RAYING" THE GOODNESS OF DESIGN

Before the design of a valve body is approved, the photo-elastic test pictured above is made on a plastic model in order to determine visually and accurately where and how stresses will make themselves felt all the way through the valve. Crane engineers don't merely hope that Crane valves will stand up—they know they will.



IS THE METAL RIGHT?

Before any metal can be accepted for use in Crane valves, it must be approved by the metallurgical laboratory. Test samples from every shipment of raw material as received, are subjected to precise metallurgical scrutiny. Thus Crane goodness is assured from the outset—and at every step in their manufacture, the quality of Crane valves is guarded by the laboratory technician.



## CRANE

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VALVES • FITTINGS • PIPE  
PLUMBING • HEATING • PUMPS



—and that goes for

## CRANE VALVES for Industrial Service

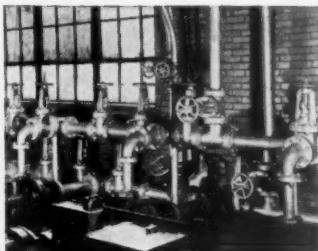
A good-looking surface is mighty tempting to the eye—but it's the goodness *inside* that proves the quality, whether you're talking of apples or valves; and the "inside" story of Crane valves is one of uncommon quality all the way through. Crane makes sure of that quality by careful engineering, by

direct laboratory control of raw material selection, by modern production technique, and by the most complete and exacting system of checks and tests used in the industry. Use Crane valves and learn how these assurances of quality are proved in length of efficient, dependable service for you.



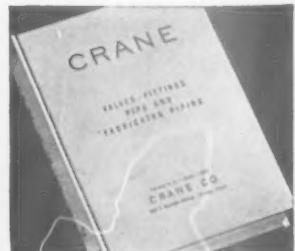
"EYES THAT CAN'T BE FOOLED"

Dimensions at Crane are checked on every valve. Here, for instance, the taper of a wedge gate is checked for the accuracy that will mean sure fit and long life when the valve gets into service. The average Crane valve passes over 40 inspections and tests to make sure that its goodness is uniform throughout.



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For three generations of actual service, Crane valves have been proving that they are good all the way through in millions of locations. Only Crane has so vast an accumulated experience in producing valves of known quality, of predictable performance in service.



If you want uncommon quality in valves of common use, look in the Crane No. 52 Catalog. In its 764 pages there are 38,000 piping items. Quick delivery is assured from a nearby stock. You will find Crane service, like Crane products, good all the way through.

NATION-WIDE SERVICE THROUGH 134 BRANCHES AND MORE THAN 500 WHOLESALERS



In 1842, when Industry's problem was availability of steel, Ryerson built up large and complete stocks.

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# RYERSON *Certified* STEELS

Write for 28 page illustrated book telling the complete story. JOSEPH T. RYERSON & SON, INC., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

# The State of Business

**W**E BELIEVE that over the years private enterprise will survive. In that faith lies the hope of mankind for progress in the production and distribution of the materials and services that make for higher living standards, and the hope for that security that comes from useful work.

We accept the public obligation that comes with ownership and management. We seek the widest possible distribution of goods and services; the most complete and stable employment of manpower, under favorable working conditions and at rates that fairly reflect ability and useful service.

The national income derives from production—from the added values of putting raw materials into useful form and delivering them at the point of use. It comes from the production of the farm, the mine, the factory, the production of power and transportation, initiated by the courage of enterprise and guided by the skill of management. The national income was thirty billion dollars greater in 1937 than in 1932. Private enterprise contributed largely to that increase, and shares the ambition of raising the income another thirty billion dollars.

In a time when human needs and human desires are greater than in any previous period in the history of our Republic, and particularly when distressing want exists among a considerable sector of our people, there can be no sound argument of overproduction. Rather, it is greater production that will be needed to fulfill these needs.

That accomplishment has been made more difficult by steadily rising costs and by the depletion of those prudent reserves which alone enabled industry to survive a period of world depression and which have helped to support the national government through a period of unprecedented spending and necessary relief.

We subscribe to the conservation of natural resources and the conservation of national morale. It is our peculiar responsibility in this infinitely complex and interdependent social and economic organization, to conserve also the essential element of capital—to safeguard its integrity, to nourish it with modernization of plant and method, and with those reasonable earnings which are necessary in order to keep it usefully employed. Plant, like every other resource, can be exhausted. For four years, depreciation exceeded plant additions, and that situation must be reversed.

That responsibility is not incompatible with the aims and prerogatives of government or of labor. It is an integral part of our historical and economic national structure—an instrument for achieving the security we seek, and a bulwark against the revolutionary program which we as a nation have rejected. That responsibility cannot be accepted by surrendering the prerogatives of enterprise to any other group. It is the testimony of the Chief Executive and the stated position of every responsible person in the national government today, that these prerogatives have not been abused, to the harm of society, save by a very small minority of business men.

Unfortunately, we are not altogether at peace. We have faith that through cooperation and understanding a solution can be reached, to the benefit of all. But cooperation is a mutual affair. And the premise for that solution, under a system of private enterprise, is not a redistribution of existing capital and its consequent attrition, but the willingness and sanction to put it usefully at work.

STUART F. HEINRITZ, EDITOR

# Developments and Advantages of Solderless Electrical Connectors

WHEN PURCHASING electrical connectors, that is, the parts for connecting together electrical conductors not necessarily of the same size or material, there are several points which should be carefully considered, other than price, before deciding on what to buy. Furthermore the conditions under which they must give service and under which they must be installed have a very direct bearing on the design to be selected. For instance in making outdoor service connections on a pole calls for a connector which is easy to handle without dropping a nut or other part. The more convenient they are to handle of course the more quickly the connections can be made, and the greater will be the production per man.

The materials and processing of the materials must be such as to withstand weather conditions and wide variations in temperature. The connections must be mechanically strong and permanent, holding for years without tightening or other attention, and they must provide good electrical contacts which will remain good more or less indefinitely. For inside work it is necessary to have connectors which will retain good electrical characteristics and which will fit into small spaces and corners, and which have contours of such a character as to facilitate effective taping. There are other considerations which will be brought out later, but it is well worth bearing in mind that great economies may be realized both in installation and maintenance costs by a judicious selection of this important, even if physically small, item of equipment.

In order to illustrate the importance of what has just been said it

will be helpful to consider the design of a group of such connectors for a number of specific purposes. It will hardly be practicable to discuss all possible conditions, but by taking up those most commonly found in practice the general principles may be set forth clearly enough to enable the reader to have a clear idea as to what should be called for even in more or less special cases.

Formerly it was considered necessary in many, if not most, cases, to make soldered connections in order to secure good permanent electrical contact. This of course meant a lot of equipment such as the furnace, solder pot, tongs, file and sandpaper, flux and other items. Such joints naturally were inconvenient to make, especially on pole lines, took a good deal of time, called for trained help, and were generally expensive and not always satisfactory. With the modern type of connector the only tool which a lineman needs is a wrench.

Some of the best of this type are assembled in two parts which are forged and of a 97% copper alloy known as durium. The alloy increases the strength and hardness of the copper so that there will not be any stretch or creep. Furthermore, the thermal coefficient of expansion is the same as for pure copper, so that the connection will not be loosened by temperature changes. Another important property of this alloy is that it does not crack under stress when subjected to corrosion from salt fogs, industrial fumes and gases, etc. In the construction of

this connector, there is only one nut which fits around both legs of the U. The nut is made from a somewhat harder alloy than the U in order to provide against failure of the threads due to the high friction and consequent wear of identical metals in moving contact when the nut is tightened.

The forged pressure bar, which swivels on the nut, and the inside of the U, have serrations to increase their grip on the conductors and to penetrate the surface oxides or dirt so as to make a good electrical contact. However, these serrations are so designed that they do not nick the conductors. Finally the connectors are designed with a sufficiently large factor of safety, mechanically, so that there is no danger of a lineman exerting so great a torque with his wrench as to strip the threads. This, of course, is a very important item, and makes it possible to re-use the connectors by changing from one location to another.

Laboratory tests and field experience have shown that connectors embodying such features give very satisfactory service. Their small size and rounded corners also make them easy to install in congested space and easy to tape. The corrosive effects and vibrations of outdoor service over a period of years do not damage the connection, either electrically or mechanically.

Several variations on this general scheme of design have been made to meet special conditions. Thus the nut may be attached by a loosely hinged device to the U so that it is all in one piece. In this way a lineman can put it in place and make the connection with one hand while holding on with the other hand. Another variation takes care of

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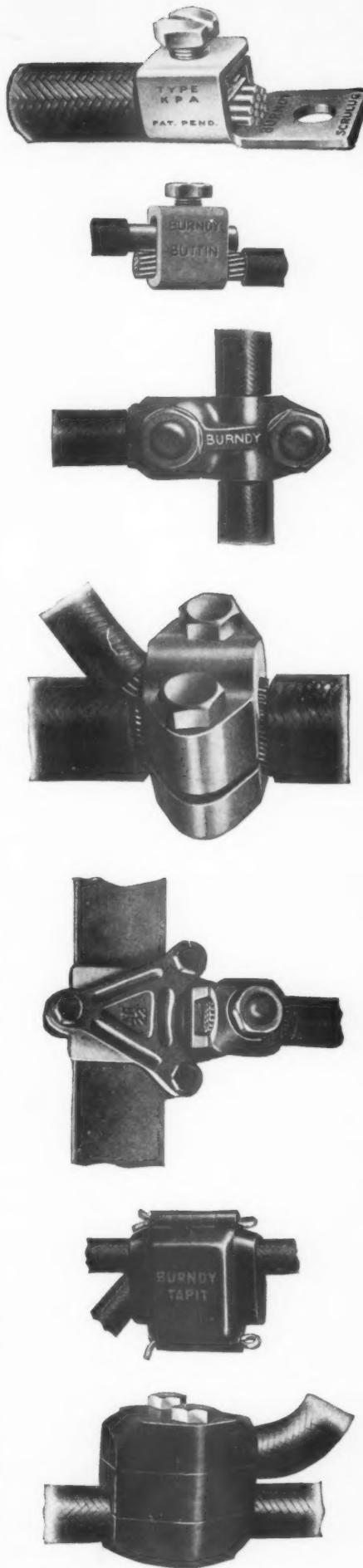
F. A. WESTBROOK  
Consulting Engineer

connections between aluminum feeder cables and copper service leads, so as to prevent electrolytic corrosion. This model is provided with bi-metallic liners consisting of flexible sheets of bonded copper and aluminum. The copper conductor is held by the copper surfaces and the aluminum conductor by the aluminum surfaces. A third type is made of duralumin, for use where both conductors are either aluminum or ASCR, without electro-chemical reaction. The design and method of manufacture is the same as of the connectors first described, made of durium.

The same principle has been adapted for making efficient electrical connections to drilled flat equipment, such as in switchboard work and transformer leads, and the like. It is applicable for grounding leads and widely used for such services. The post which holds this device to the flat part may consist of a stud, bolt or threaded socket base depending on conditions.

Of course there are a great many other types of connections for which connectors have been developed and a discussion of the subject would not be complete without at least a brief reference to them. For instance there is the question of lug connections. There are usually many of these in large industrial plants, sub-stations and power houses, and anything which can be done to decrease the cost of installing them is worth while even if the amount saved per connection is small. This means the elimination of solder through the use of connectors which can be installed with a wrench, screw driver or pliers. It is also important to bear in mind that lugs of this type may be reused, which is seldom, if ever, done with lugs calling for solder.

Several types of these lugs—for straight taps, for connecting two cables coming from opposite directions to a cast pad, and for making right angle taps—need only a wrench for installation. Another type has been especially designed for panel boards, cut-out boxes, and motor connections, and can be put in place with a screw driver. Others



are provided with a threaded stud connector, and the conductor is made tight with a wrench.

Then there are numerous types of connectors for making taps to either insulated, weatherproof, or bare connectors. Typical of these is one design which calls for merely tightening two cap screws; it has a solid copper block for the electrical connection between the two conductors, and is insulated with a bakelite shell protected mechanically with case hardened steel plates. Another is provided with a bakelite insulating shell held in place by cotter pins. In order to avoid drilling a bus bar, connectors have been designed by which one or several cables can be clamped to the bus bar with a single clamp.

End-to-end connections of conductors of the same or different sizes can be made quickly and efficiently. Those for house service entrances can be installed with a wrench, screw driver or pliers. In the heavy duty units, lock washers are used to guard against loosening by heavy loads and vibration.

Expansion joints have also been devised for use in sub-stations and power houses, which are particularly desirable in outdoor locations. Of course the copper or aluminum buses themselves are subject to very considerable expansion and contraction due to the wide variations in temperature in the course of the year. However, they are often rigidly attached to steel or concrete supports at one end, and to rigid insulating bushings at the other end. This expansion and contraction causes very severe strains on the porcelain bushings and frequently results in their mechanical failure. For this reason, expansion connectors have been devised to meet such conditions. The settling of foundations also sets up such strains. A typical joint for use under these circumstances consists of a sliding tubular element with flexible braided cables clamped at each end and tinned to reduce the tendency to

Photos by courtesy of  
Burndy Engineering Co., Inc.  
New York

### Summary of Advantages of Solderless Connectors

They reduce the possibility of error through careless work.

They make inspection easier by making connections visible and removing hidden uncertainties.

They reduce accidents.

They tend to lessen the necessity of close inspection of every connection when time is such a factor as it is today.

They substitute a simple tool for solder torches, ladles, wet cloths, etc.

They eliminate temporary makeshift work, and thus reduce future problems.

They eliminate the loss of connections and service due to overload.

They help to offset the shortage of skilled labor prevalent in some sections of the country.

Solderless connectors are just one more addition to the growing list of safe equipment and take their place alongside the other late developments such as dead-front panels, safety switches, cabinets, concealed circuit feeders, new insulations, and adequate wiring.

corrosion. The braided cable is considered better design than built up copper strips, as a general thing, because the cable does not tend to flare apart when contraction takes place. There are also various types of sliding bus supports available.

Clamp type connectors are now also being given more and more serious consideration in underground work. This is especially true with respect to making taps for distribution purposes. The making of taps and splices in manholes is bound to be expensive because of the essential need of excluding all moisture, gases and oil, the limited working space, the cost of junction boxes, the difficulty of changing connections and of making connections between rubber and lead or rubber and braided connectors and impregnated paper feeder cables. To meet these conditions, an insulated multiple service tap has been designed, with provision for three, four, six or eight leads. This device consists of a one-piece copper core, covered with heavy insulation. The core has openings into which copper alloy clamps are screwed to accommodate the required number of taps. According to the experience of at least one power company, the cost of making splices in the old manner has been reduced no less than 30% by adopting this new method.

The copper body is tinned to prevent corrosion, and the insulation is a pliable compound of requisite

physical strength and toughness to resist the deteriorative effects of underground service. This arrangement has the great advantage that the only tool needed to make or take down a connection is a wrench, very little metal is left exposed and requires taping, and the cable sockets are made to accommodate a large number of sizes. The only parts which must be stocked by the user are the cones which fit over the cable and into the socket. If the sockets are not in use, they are closed with a rubber plug which can be easily removed when a connection is to be made. The cone nut assembly is then inserted, or screwed into the socket, and the cable is pushed in and clamped. The whole thing is compact and light in weight, is easily supported in the manhole, and takes up very little space. The unit is also strong enough so that it will not be damaged by the usual rough treatment which is inseparable from the service and the contingencies of installation. It may be removed from one location and placed in another with full salvage value. The insulation is good for from 30,000 to 36,000 volts.

A device for splicing wires on an outside pole line without the use of any tools at all has been developed and proved to be very efficient. It can be used over and over again, and is small enough to permit of passing through cable sheaves. The fact that tools are eliminated, that

there is no loss in salvage, and that the joint may be made very quickly, means that important economies are possible. The wire or cable is gripped by the automatic jaws, which have herringbone serrations on their contact surfaces. The jaws may be opened for releasing the conductors by inserting any pointed tool, or a nail, through a slot in the shell and prying them apart slightly. Both the jaws and the shell are made of durium, which has a definite elastic limit up to which there will be no "creeping," as with pure copper, but which has almost the same electrical conductivity as copper. These are available for both solid and stranded conductors.

Of course there are other types of connectors on the market, and connectors for other purposes, but the above makes a fairly comprehensive list and sets forth the principles involved for all the ordinary conditions encountered in the field. It is to be noted that none of those discussed call for the use of solder. In many cases their first cost may be more than that of devices involving soldered connections. But the saving in time and labor, and the re-use value, almost invariably will more than offset this difference in first cost by a substantial margin. Furthermore such joints have the ability to carry overloads, which means freedom from shutdowns. In an industrial plant, this is perhaps more important than all their other advantages, for shutdowns mean upset production schedules, dissatisfied customers, and loss of revenue.

Finally, installation costs may be reduced, and more efficient connections made, by selecting the right type of connector specifically designed for the conditions in hand, and from the foregoing it will be seen that designs have been developed which are adapted for almost every kind of condition likely to be encountered in service.

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HAROLD A. CARTIER has been appointed purchasing agent for Walter Kidde Constructors, Inc., New York City, succeeding the late Irving R. Lewis.



# Reading the Business Barometers

## 12: Food

HAROLD A. KNIGHT

**F**RANKLY, THE ITEM of food, its prices and volume of consumption, does not afford a particularly good barometer of business conditions generally. It is stated, for instance, that during the current recession, when the pace of steel production fell from 90% to 25% of capacity, the consumption of canned food, one of its most important divisions, did not decline more than 1%. Consumers often switched from the more expensive to the cheaper brands. But the customers must still eat, come what will.

Yet food is one of those basic needs, joined with clothing and shelter which have been discussed in preceding articles, that can claim for its market the entire population. The well informed business man should perhaps card index in his brain a few basic facts concerning food and where to lay hands on more (facts) when needed.

The annual value of the world's plant food is about five times greater than the yearly value of the world's mineral production, Clarence Francis, president of the General Foods Corporation, recently told the New York Stock Exchange Institute. The American public spends con-

siderably more for food than it does for automobiles. It takes the largest slice of our income.

The food industry in all of its phases gives some sort of employment to one-third of our population, continued Mr. Francis. Agriculture employs more people than any industrial activity. Its raw materials furnish the basis for nearly one-fifth of all American manufacturing activity. Food processing alone gives employment to more than 11% of all employees in American manufacturing.

The food industry furnishes the railroads with more than one-fifth of their freight traffic. Food processors buy 37% of all metals used by the processing industries. They buy 10% of all general machinery. Twenty-five cents out of every dollar spent in retail stores goes for food.

Canned foods are perhaps the

most representative single group of edibles. They have held their own with the use of fresh vegetables, transported often in refrigerated trucks, and with the newer frozen foods. Moreover canning is ever expanding and keeping pace with developments in other lines. Thus Texas and Florida are both becoming important canning centers. Canning keeps spreading geographically.

Following the packs of the major fruits and vegetables, both in preliminary estimates and final returns of the National Canners Association, is necessary for him who would keep well informed on food statistics. Moreover it is usually an axiom that when 18,000,000 cases of a fruit, vegetable or fish are canned in a certain season, about 2,000,000 cases will be left over in canners' hands. As much as 5,000,000 cases will be regarded as a burdensome excess unless there should be a crop shortage the following year.

The 1937 pack of peas was about 23,500,000 cases, a large pack, but still under the nearly 24,000,000 cases in 1935. Packs of peas, corn and tomatoes, the three major

*Continued on page 50*

**Next Month:**  
**Cotton**



*"I've come to you because I want a 1938 price forecast that is  
absolutely free from statistical bias."*

# SILHOUETTE STUDIES

## 22: Bert Fought Downey

**A**N EXTRAORDINARY CAPACITY for sustained enthusiasm, backed with sound common sense, determination, a natural genius for genuine friendliness, and the willingness to put in long hours at hard work—this is a combination that inevitably makes for leadership. These are the qualities that have brought an Ohio farm boy to the head of a successful manufacturing concern. Incidentally they have won for him the respect and affection of a wide circle of associates, and have led to a distinguished record of service in varied fields of civic, business and fraternal activity.

At various times over the past several years he has been president of the Springfield Rotary Club, the Purchasing Agents Association, and the Shrine Club, a director of the Chamber of Commerce, a member of the Advisory Board of the First National Bank, Senior Counselor of the United Commercial Travelers, Master of St. Andrew's Lodge, F. & A. M., and Potentate of Antioch Temple. More remarkable than the record itself is the fact that he retains the same keen and active interest in these associations today as he did while holding office, and is just as ready to roll up his sleeves and go to work in their behalf. It is a full life and a busy and useful one, never scheduled to fit into a six-hour day and a five-day week.

Recently he has acquired a new enthusiasm. For twenty-eight years, during the period when he was advancing from the bookkeeper's desk to the general manager's office, he prized his Saturday afternoons as "clean up" time at the office, with an occasional Sunday morning thrown in for good measure. But one May day in 1936 he was persuaded to wrap his fingers around a golf club for the first time and sent the little white ball skimming along the fairway. It was a new thrill.

With characteristic ardor, he has been over the course practically every week-end since that time, winter and summer, rain or shine, for sheer love of the exercise, fresh air and companionability of the game. No Bobby Jones by talent or ambition, he is a self-taught golfer, goes around in the high eighties, and far from worrying about his score he is just as likely not to count his strokes at all. But he has won that most valuable of all trophies—a healthy bronzed glow in his complexion and a new spring in his step. And neither his business nor his other interests have been permitted to suffer. Bert Downey knows how to play as well as how to work.

**B**ERT WAS BORN ON A FARM near Sycamore, Ohio, on November 23, 1883. The family was well known throughout that section. In the preceding generation, four brothers had been circuit riders in the ministry of the United Brethren Church. The fifth had gone to farming on an ambitious scale, with more than ordinary success. When the family acres were free and clear, Bert's father sought a further outlet for his enterprise and energy by going into the farm implement business in the nearby town. That was in 1893. For a while, the new venture prospered. Then depression struck, and in the resulting collapse he lost not only the store but the farm as well, all except the house and the tiny plot of land on which it stood. When Bert was only thirteen, he was doing a man's work in the family's struggle to eke a living from this limited estate and to recover their former standing—a task which was eventually accomplished, though only after years of courageous perseverance.

Meanwhile the boy was getting his education at a small country school. A little later, he took the Boxwell examinations and earned

the privilege of attending the graded school at Sycamore, tuition-free. At fifteen, he passed the county teachers' examination, but the certificate was withheld on account of his youth.

In September of 1900, Bert was teaching in the country school, with four pupils in his class who were older than himself, and did such a good job that three of them had their certificates at the end of the year. A summer normal course at Ohio Northern University qualified him to teach in the grammar school at Sycamore. With that exception, his summers were spent on the farm and pitching mud in a local tile yard.

But the confinement of the schoolroom was undermining his none too robust health, and after four years of teaching he was advised to take up some light outdoor occupation. Presently, therefore, he was traveling the county as a piano salesman, with such success that he was called to Springfield to take over a job as city salesman and was fairly embarked on a commerical career.

For the more than thirty years since that time, Bert Downey has been intimately and inseparably associated with the city of his adoption, but not with the piano business. It was a free and easy life, but the young man was sensible enough to realize that the opportunities it offered were not of a sort to lead anywhere in particular, so he gave it up to take a course at the Willis Business University, which led in turn to a job as bookkeeper for the Yost Gearless Motor Company, at fifteen dollars a week.

This company was engaged in the manufacture of a water power washing machine. The product was an excellent one. Though the type has long since been supplanted in popular demand by electrical models, and manufacture was stopped years ago, the company is still servicing

units that have been in continuous use for more than thirty years. The young bookkeeper was enthusiastic about the business from the start, and as he gradually took over the cost accounting, purchasing and production work, he put aside a part of his earnings and invested in the company's stock from time to time until he became the majority stockholder. The Superior Spring Company was formed in 1920, and four years later the two organizations were merged under the name of the Yost Superior Company, with the spring business of major importance, and with Downey as secretary, treasurer and general manager.

PURCHASING WORK HAS BEEN another of his business enthusiasms. Though his work has always been of a general nature, embracing a variety of duties, he was early impressed with the importance of the buying function and the desirability of a wider mutual acquaintance among purchasing men.

### SEALING IT WITH A KISS



All right for Engagements but for boxes use "RED STREAK" Sealing Tape

There is no percentage in sealing packages with tape that doesn't always stick tight. Use Red Streak Sealing Tape . . . it holds tighter than a lover's embrace and is as permanent as a wedding. And yet with its assured adhesion Red Streak Sealing Tape costs no more. Write for information.

THE BROWN-BRIDGE MILLS, INC.  
TROY, OHIO



He joined the Springfield Association shortly after it was organized, and immediately took an active part. But loyal as he was to the local group, he promptly began to preach and to work for closer cooperation with other purchasing associations as a means of strengthening the ties and enhancing the values derived from the organization. Aside from the wider circle of contacts to be gained in this way, it seemed to him that the time afforded by brief local meetings was insufficient for a thorough discussion of common problems and for expert analysis of markets and materials, and he visioned a full weekend conference, attended by representatives from several neighboring cities, as one effective way of accomplishing that purpose.

With his characteristic practical approach, he started with the nearby association at Dayton. At a joint picnic of the Dayton and Springfield groups, the plan of the first District Conference was born. Downey insists that the idea naturally grew out of a general discussion in which many had a part, that the proposal to invite representatives from Cincinnati and Columbus made it imperative to include Toledo, Cleveland, Pittsburgh and Akron in the plan as a matter of common courtesy, and that no special personal credit is due for this project which came to embrace the entire district and to perform a most useful function over several years. But others who took part in those early plans and who have since rendered distinguished service in the district, insist that Bert Downey richly deserves recognition as the "father" of the District Conference idea, and Bert himself is about the only one who will argue against that accepted fact.

The plan itself did not work out exactly as he had conceived it. A basic feature of Downey's idea was to submerge local interests, distractions and domination by holding the sessions at some central point away from any single association headquarters. That idea has much to commend it. However, when it came to the actual working out of

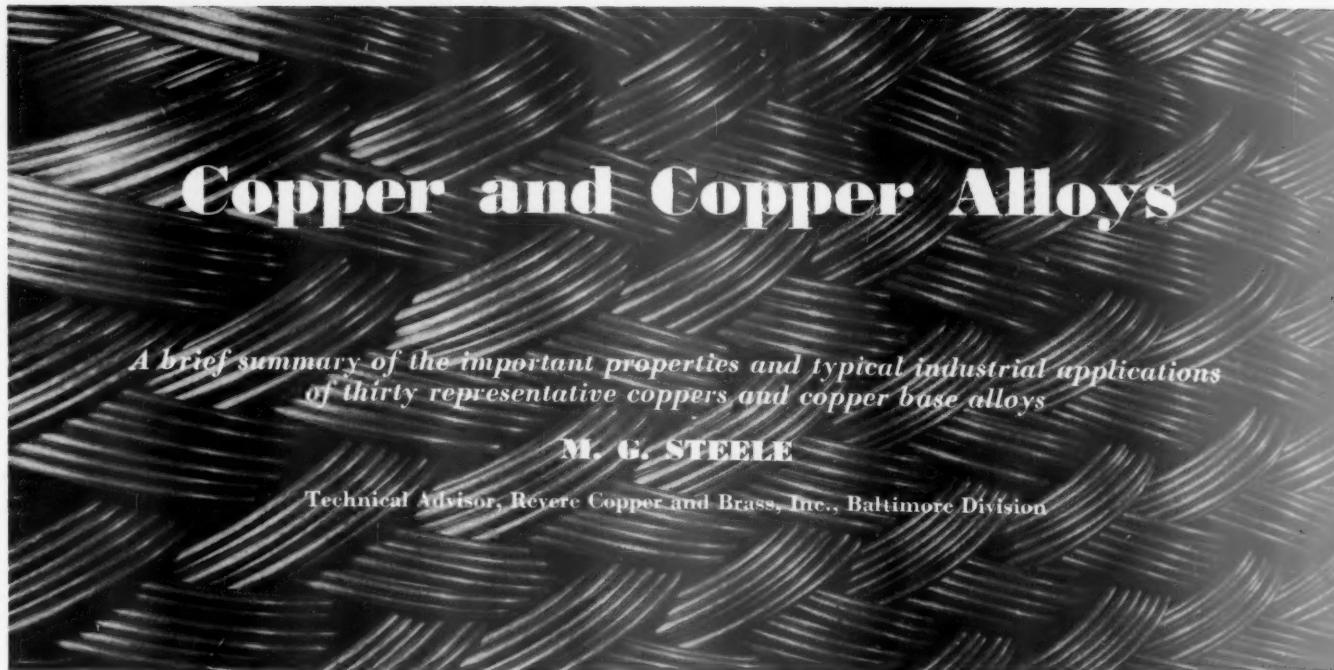
the plan, it fell back upon his own shoulders, and through practical necessity the first conference was held in Springfield. In succeeding years a policy of rotating among the various association cities was adopted.

The national president and vice president came to the conference with an attitude that frankly said, "Show us." But there was no question as to the complete success of that first week-end meeting, and no question about its becoming an annual event of far-reaching importance, until depression temporarily made it necessary to suspend. It has resulted in an unusual and lasting spirit of solidarity and cooperation within the district, has developed valuable association workers who have come into positions of leadership with a thorough background of familiarity with the district as a whole, and it has reconciled local and personal ambitions in a harmonious program.

BEYOND SERVING AS PRESIDENT of the Springfield group, and since 1929 as chairman of the Ohio Committee on Centralized Governmental Purchasing, Downey has never accepted office in the national organization, though he has frequently been urged to do so. There is little doubt that he would value such recognition very highly, and that he would be a most able man in association councils. But with discriminating fairness he has decided that he is not qualified for such service due to his activity in sales development work, which is a part of his managerial duty.

However, he has the same faculty of fine discrimination in his association relationships, and is able to meet with purchasing men as a purchasing man, just as he can meet with a manufacturers' group as an employer. It's a double-barrelled job, but Downey is able to keep both phases clearly segregated, and he is careful to do so. He calls on purchasing agents and their companies, and sells them, and some of his most intimate friendships are among the purchasing group. But he has

*Continued on page 52*



# Copper and Copper Alloys

*A brief summary of the important properties and typical industrial applications  
of thirty representative coppers and copper base alloys*

M. G. STEELE

Technical Advisor, Revere Copper and Brass, Inc., Baltimore Division

THE ACCOMPANYING chart presents, in tabular form, a schedule of thirty typical coppers and copper alloys which are more or less fundamental in character. The metals which are listed on this schedule represent most of the typical commercial forms in which wrought copper and copper base alloys are manufactured. Certain important properties are listed, the forms in which each is commercially supplied are given as well as properties, uses and methods of fabrication.

The metals have been arranged in six groups for clearness: the coppers, the brasses, the special brasses, the bronzes, the nickel silvers and the cupro-nickels. A discussion of the metals contained in this list will give a clear idea of their characteristics and uses and a definite picture of a basic group of typical coppers and copper base alloys.

The composition of each copper or copper base alloy is given in the attached schedule and it will be noted that each group is arranged in order of decreasing copper content. The tensile strength, as well as the elastic limit and elongation for both the hard and soft condition is given in each case. The upper figures are for the hard metal and the lower figures for the soft metal. These figures are predicated on the properties of sheet material and will vary slightly for rod, tube, plate, etc.

The tensile strength is, of course, the stress, expressed in pounds per square inch, required to break a given metal in tension.

The elongation is the percentage increase in length observed in a 2" length of the test sample before fracture. The 2" is taken at the reduced diameter section where fracture takes place. The elongation is an index of the ductility of a metal.

Another measure of ductility is the so-called "reduction of area." This is the ratio between the area of the

smallest cross-section of the test specimen at the time of fracture and the original area at the same point before stress is applied.

The elastic limit is the greatest stress, expressed in pounds per square inch, which a material is capable of withstanding without a permanent set or deformation remaining upon complete release of the stress.

Other physical properties such as thermal and electrical conductivity, melting point, coefficient of expansion, etc., have not been given, for lack of space, but can be easily obtained from text books on metals.

When tensile strength is used as a design value it is customary to divide this value by a safety factor such as, say 5 or 6, to obtain a conservative working stress for the metal. In some cases it may be desirable to use elastic limit as a basis for determining a suitable working pressure.

These metals are manufactured with different standard degrees of hardness or "temper." This hardness is obtained by cold rolling after the last annealing, and it depends upon the percentage of cold reduction rather than on the passes through the roll. When the thickness is reduced one number of the B & S gauge, that is, when a No. 18 sheet (.040") is reduced to No. 19 (0.036"), the resulting sheet is known as  $\frac{1}{4}$  hard. When reduced two numbers it is  $\frac{1}{2}$  hard, three numbers  $\frac{3}{4}$  hard, and when reduced four numbers it is hard. Extra hard is obtained by the reduction of six numbers; spring hard by eight numbers; and extra spring hard by ten numbers. However, the softness of the metal before the final rolling has an influence, and if very close limits of temper are desired, the hardness number on some standard testing machine must be specified.

While numbers are applied to the degrees of hardness in the tempered metals, the determination of grain size is the method of testing the relative softness. The degrees of softness are dependent upon the finished grain

Abstract of an address before the Baltimore Purchasing Agents Association, November, 1937.

size, which is produced by a control of the final annealing operations. A large grain denotes a soft material and a fine grain denotes a hard material. All grain sizes are measured in millimeters at 75 diameters magnification.

### Copper

To most people copper is merely copper whereas, as a matter of fact, there are several varieties of copper that vary widely in their characteristics and properties. The writer has chosen six important types for discussion.

These are arranged for convenience in the order of increasing tensile strength.

#### 1. Electrolytic Copper.

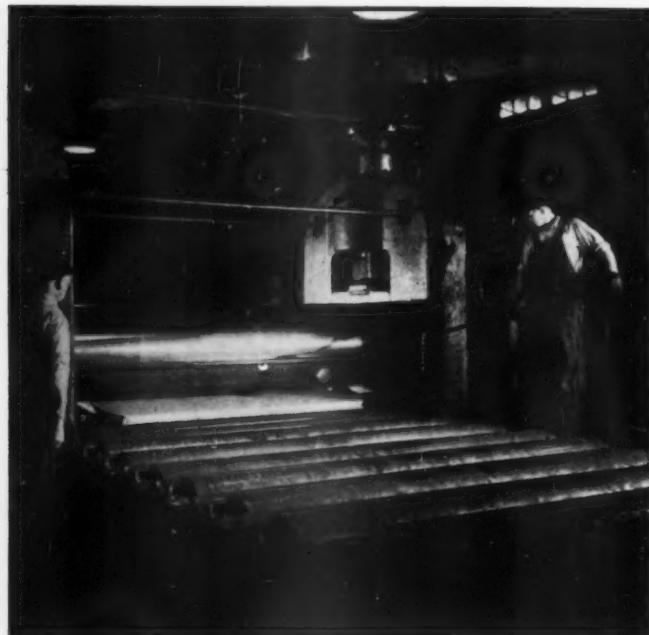
The bulk of all wrought copper is electrolytic copper. It has high resistance to corrosion, high conductivity, great ductility and an attractive appearance. It is obtainable in almost every wrought form. It may be stamped, formed, drawn, forged, welded and soldered.

It has many uses including bus bar, high conductivity tubing for electrical uses, house roofing, flashing, gutters and spouting, kettles, vats, gaskets, print rolls, lock seam tubing, forgings, and for coppersmithing.

Sheet electrolytic copper is furnished in electro plated finishes including tin, nickel, chrome and lead, and in hot dipped tin and lead finishes.

#### 2. Lake Copper.

This contains commercially about 7 ounces of silver per ton, which materially increases its annealing (softening) temperature. This is very advantageous where it is subjected to operations involving dipping in molten solder as in the manufacture of automobile radiators. Its conductivity is equal to that of electrolytic if free



Rolling Condenser Plate

Title photo on page 23: Copper Water Tubing  
Photos by courtesy Revere Copper & Brass, Inc.

from arsenic. It is used for radiator cores and thin lock seam tubing.

#### 3. Phosphorized Copper.

Phosphorous is added to this copper to remove all oxygen. It is used for applications where the presence of oxygen would be harmful, as for example, where a copper of exceptionally high ductility is required, or when it is to be welded. Its electrical conductivity is not as great as that of electrolytic copper and for high conductivity tubing electrolytic is used.

Phosphorized copper is used for water, refrigeration and oil burner tubing, in fact, for most copper tube requirements because it draws and coils better. Copper tube, hot tin coated inside and outside by a new process is available and has several important applications.

#### 4. Arsenical Copper.

The inclusion of a small amount of arsenic in copper gives it greater tensile strength and hardness; it also increases its resistance to heat and to flaking. For this reason it is often used for heat resisting condenser tubes.

#### 5. Cadmium Copper.

Cadmium copper has higher tensile strength than the preceding coppers and good electrical conductivity. For this reason it finds extensive application for trolley wire. In the wire form strengths of 92,000 p.s.i. with an electrical conductivity of 80% are readily obtainable in the cold drawn alloy.

#### 6. Beryllium Copper.

Beryllium copper is a recent and interesting development. The introduction of about 2% of beryllium into copper gives it phenomenal qualities of tensile strength and hardness together with good ductility. It can be heat treated to procure these values. It has high conductivity.

It has a wide potential range of applications which are limited at the present time by high cost. It is used for non-sparking cutting tools, springs and high strength parts where high conductivity is important.

### Brass

Brass is an alloy of copper and zinc in varying proportions. Brasses are more ductile than the corresponding copper-tin alloys or bronzes but are not as hard. When the zinc content exceeds 45%, however, the alloy becomes very brittle. Brass is malleable and can be readily worked cold. Like most metals, it becomes hard when cold worked but it can be annealed by simply heating and cooling.

The normal designations of annealed brass are: Deep drawing, drawing, and light annealed, which are sometimes also designated as dead soft, soft, and light annealed.

True brasses contain only copper and zinc, but tin and lead are sometimes added for special purposes. Iron is an impurity and ordinarily considered very detrimental to the alloy. Lead comes as an impurity in the zinc. A high grade of zinc containing not more than

COPPER AND COPPER Base Alloys. (WROUGHT TYPES)														
NUMBER	NAME OF COPPER OR ALLOY.	COMPOSITION.						TENSILE STRENGTH (HARD AND SOFT) LBS. PER SQ. IN.	ELASTIC LIMIT (HARD AND SOFT) LBS. PER SQ. IN.	YIELD POINT	PROPERTIES AND USES.			METHODS OF WORKING
		COPPER	ZINC	LEAD	TIN	NICKEL	ZINC 10%				WROUGHT			
1	COPPER (ELECTROLYTIC)	99.9						51,000 32,500	4 47	48,000 12,000	SHEET BAR TUBE - ROD PLATE, ETC	CORROSION RESISTANCE - DUCTILITY HIGH CONDUCTIVITY - ROOFING-BUSBAR HIGH CONDUCTIVITY TUBING.	STAMP-DRAW WELD-SOLDER, FORGE-FORM	
2	COPPER (LAKE)	99.9	SILVER 7 OZ. PER TON					51,000 32,000	4 47	48,000 12,000	SHEET STRIP ROD	HIGH ANNEALING POINT. AUTO RADIATOR FINS, LOCK SEAM TUBING.	STAMP-DRAW SOLDER FORM	
3	COPPER (PHOSPHORIZED)	99.9	.04 PHOSPHOROUS MAX.					55,000 35,000	5 45	44,000 16,000	SHEET STRIP TUBE	WATER, REFRIGERATOR AND OIL- BURNER TUBING. DRAINS AND COILS BETTER THAN NO. 1	STAMP-DRAW FORGE	
4	COPPER (ARSENICAL)	99.9	.04 PHOSPHOROUS .30 ARSENIC					60,000 36,000	4 40	55,000 7,000	SHEET TUBE PLATE	HIGH STRENGTH-RESISTS HEAT AND FLAKING CONDENSER TUBES	STAMP DRAW FORGE	
5	COPPER (CADMIUM)	99	1.00 CADMIUM					80,000 35,000	4 45	68,000	ROD	HIGH STRENGTH HIGH STRENGTH PARTS TROLLEY WIRE	DRAW FORGE	
6	COPPER (BERYLLIUM)	98	2.00 BERYLLIUM					175,000 75,000	6 45	134,000 31,000	SHEET TUBE ROD	VERY HIGH STRENGTH-HARDNESS HIGH CONDUCTIVITY - SPRINGS NON-SPARKING CUTTING TOOLS, ETC	STAMP-DRAW FORGE-FORM	
<b>⇒ BRASSES ⇒</b>														
7	GILDING METAL	85	5					55,000 35,000	5 38	39,000 11,000	SHEET STRIP TUBE	DUCTILITY - REDDISH GOLD COLOR PRIMERS, DETONATOR FUSE CAPS JEWELRY - FORGINGS	STAMP-DRAW FORGE FORM	
8	COMMERCIAL BRONZE	90	10					67,000 37,000	3 40	53,000 11,000	SHEET STRIP TUBE	DUCTILITY - USED FOR COLOR MATCH STAMPED HARDWARE, BULLET JACKETS JEWELRY - CASKETS, SCREEN CLOTH	STAMP-DRAW FORGE FORM PERFORATE	
9	RICH LOW BRASS	85	15					75,000 42,000	4 43	52,000 15,000	SHEET STRIP TUBE	CORROSION RESISTANT - BRASS PIPE JEWELRY-BADGES, NAME PLATES ETCHINGS-TAGS-DIALS, ETC	STAMP-FORM DRAW-BLANK ETCH-WELD	
10	LOW BRASS	80	20					85,000 43,000	4 50	65,000 15,000	SHEET STRIP TUBE	CORROSION RESISTANCE. JEWELRY (FOR GOLD PLATING) FULTON BELLOWS-YELLOW COLOR	STAMP-FORM DRAW-SPIN	
11	SEVENTY THIRTY CARTRIDGE BRASS	70	30					86,000 45,000	4 50	65,000 15,000	SHEET STRIP TUBE	HIGH DUCTILITY- DEEP DRAWING PINS, RIVETS, EYELETS, RADIATOR'S CARTRIDGE SHELLS - SPINNING	STAMP SPIN DEEP DRAWING	
12	HIGH BRASS	66	34					90,000 48,000	4 50	70,000 15,000	SHEET STRIP	HIGH DUCTILITY-DEEP DRAWING BRASS PIPE-AUTO REFLECTORS STAMPINGS-RADIATOR FINS, ETC	STAMP-SPIN DEEP DRAWING	
13	LEADED HIGH BRASS	65	33.5	1.5				80,000 45,000	5 60	60,000 15,000	SHEET STRIP	ENGRAVERS BRASS-LIGHTING FIXTURES CLOCK & WATCH BACKS-GEARS-KEYS FORMING BY BENDING-FREE MACHINING	STAMP-FORM BEND-PUNCH	
14	FREE CUTTING ROD	62	35	3				62,000 47,000	20 60	25,000 15,000	ROD	TYPICAL BRASS ROD FREE MACHINING-EXTRUDED SHAPES SCREW MACHINE PARTS	MACHINE THREAD EXTRUDE	
15	FORGING ROD	60	38	2				70,000 50,000	10* 45	31,000 15,000	ROD	HOT FORGINGS. FAUCET HANDLES-SHOWER HEADS	FORGE MACHINE EXTRUDE	
16	MUNTZ METAL	60	40					80,000 57,000	9.5 48	60,000 15,000	SHEET PLATE TUBES	CONDENSER TUBES AND HEADS SHIP SWEATING-LARGE SHEETS PERFORATED METAL-BRAZING ROD	DRAW-PUNCH FORGE	
17	ARCHITECTURAL BRONZE	56	4125	275				70,000 50,000	10 20	55,000 15,000	SHEET STRIP	STRENGTH-HARDNESS-FREE CUTTING EXTRUDED SHAPES - FORGINGS INTERIOR ORNAMENTAL BRONZE	EXTRUDE FORGE MACHINE	
<b>⇒ SPECIAL BRASSES ⇒</b>														
18	SILICON BRASS	78	20	2.00 SILICON				110,000 55,000	4 61	83,000 12,500	SHEET STRIP	HIGH STRENGTH-WELDABILITY REFRIGERATOR EVAPORATORS FIRE EXTINGUISHER SHELLS	RESISTANCE WELD STAMP DRAW	
19	ALUMINUM BRASS	76	22	2.00 ALUMINUM				83,000 62,000	17 52	75,000 62,000	TUBE	RESISTANCE TO CORROSION AND EROSION SELF HEALING SKIN CONDENSER TUBES	DRAW EXTRUDE	
20	ADMIRALTY	71	28		1			95,000 45,000	5 60	92,000 18,000	SHEET STRIP TUBE	RESISTANCE TO CORROSION, ESPECIALLY OF SEA WATER CONDENSER TUBES	STAMP DRAW EXTRUDE	
21	NAVAL BRASS	60	3925		.75			75,000 54,000	15 45	39,000 15,000	SHEET ROD TUBE	RESISTANCE TO CORROSION-SEA WATER, TUBE HEADS-MARINE SHAFTING-BOLTS FORGED PARTS-WINDOW ANCHORS	DRAW FORGE	
<b>⇒ BRONZES ⇒</b>														
22	PHOSPHOR BRONZE	98.75	.05 PHOSPHOROUS	12				65,000 40,000	4 48	50,000 15,000	SHEET STRIP	RESILIENCE-STRENGTH-HARDNESS RESISTANCE TO CORROSION SPRINGS-BEARINGS,MISC SMALL PARTS	STAMP FORM WELD	
23	PHOSPHOR BRONZE	92	.05 PHOSPHOROUS	8				110,000 55,000	3 55	85,000 25,000	SHEET STRIP ROD	SIMILAR TO NO. 22 ABOVE WELDING ROD	STAMP FORM WELD	
24	SILICON BRONZE	96.25	.325 SILICON	.50				110,000 60,000	5 55	100,000 25,000	SHEET TUBE ROD, ETC	STRENGTH-WELDABILITY-CORR. RESIST. TANKS-BELTS-SCREENS-LAGS-CHAIN LOCOMOTIVE HUB LINERS-WELDING ROD	STAMP-DRAW FORGE-WELD EXTRUDE-CAST	
25	ALUMINUM BRONZE	95	5.00 ALUMINUM					105,000 57,000	5 55	80,000 24,000	SHEET TUBE ROD	CORROSION RESISTANCE-STRENGTH GOLDEN COLOR CONDENSER TUBES-GIFT ARTICLES	STAMP EXTRUDE DRAW	
26	MANGANESE BRONZE	59	39	125 IRON	.75	.05 MANG.		75,000 60,000	5 35	50,000 15,000	SHEET STRIP ROD	RESISTANCE TO WEAR AND CORROSION WELDING ROD-PERF. COAL SCREENS EXTRUDED WEARING PARTS	EXTRUDE PERFORATE WELD	
<b>⇒ NICKEL SILVERS ⇒</b>														
27	NICKEL SILVER (TYPICAL)	65	20			15		93,000 58,000	5.5 45	75,000 15,000	SHEET STRIP ROD	RESISTANCE TO CORROSION-STRENGTH EXTRUDED SHAPES-TABLE SILVER INSTRUMENTS-KEY STOCK-SPRINGS	FORGE EXTRUDE STAMP	
<b>⇒ CUPRO NICKELS ⇒</b>														
28	CUPRO NICKEL (EIGHTY TWENTY)	80				20		80,000 49,000	3 42	78,000 17,000	TUBE	RESISTANCE TO CORROSION, EROSION, HEAT AND CHEMICAL ATTACK CONDENSER TUBES		
29	CUPRO NICKEL (SEVENTY THIRTY)	70				30		84,000 49,000	4 50	83,000 18,300	TUBE	SAME AS NO. 28 ABOVE BUT MORE RESISTANT TO CORROSION ETC CONDENSER TUBES		
30	CUPRO NICKEL (ZINC ALLOY)	75	5			20		85,000 50,000	5 35	77,000 23,000	SHEET TUBE ROD	SAME AS NO. 28 ABOVE BUT LESS RESISTANT TO CORROSION ETC CONDENSER TUBES		

PREPARED BY M.G. STEELE, TECHNICAL ADVISOR, BALTIMORE DIVISION, REVERE COPPER AND BRASS, INCORPORATED  
11-15-37

0.07% of lead is used for the best brass. Tin is sometimes added to give greater strength and hardness, and a desired color. Lead is intentionally added to some mixtures to improve the machining.

The sheet brasses vary in proportion from about 60% copper up to pure copper. They differ in color from light yellow to a copper red. An increase in the copper content produces a golden color, while an increase in the percentage of zinc lightens the color of the alloy to light yellow. The cost of brass increases with the percentage of copper.

More than 75% of all wrought brass contains about 65% copper and 35% zinc. There are twelve classifications of commercial rolled brass, including four special brasses shown on our list, and in addition two typical brass rod mixtures.

A wide variety of uses can be made of the standard sheet brasses by selecting the one best suited for a given job, and varying its qualities during the fabricating operations. With a given composition, softness in brass is obtained at the expense of strength and the smoothness of surface when polishing. Likewise, strength and hardness are obtained at the expense of ductility and bending capacity.

#### 7. Gilding Metal.

This alloy contains 95% copper and 5% zinc. It has a reddish gold color. It is the weakest of the brasses and is used for small articles such as bullet jackets, detonator fuse caps, primers, jewelry and small forged parts. It is ductile and easy to work. It may be spun.

#### 8. Commercial Bronze.

This alloy derives its name from its bronze color but is a true brass. It contains 90% copper and 10% zinc. It is very ductile and is much used because of its attractive bronze color.

It is used for stamped hardware, trim, bullet jackets, costume jewelry, bronze caskets, screen cloth, forgings, screws and rivets. It is sometimes also called "Gilding Metal."

#### 9. Rich Low Brass.

So-called because it is low in zinc. Often called red brass. It contains 85% copper and 15% zinc. It is reddish in color, has fairly good strength and is quite resistant to corrosion.

It is used for so-called "red brass pipe," condenser tubes, jewelry, badges, name plates, etchings, tags, dials, flexible hose and hardware. A very useful alloy.

#### 10. Low Brass.

Low brass contains 80% copper and 20% zinc and is often called "eighty-twenty." It is quite resistant to corrosion. It has a fine yellow color and is used for ornamental and architectural work, jewelry (for gold plating), clock dials, flexible hose and Fulton bellows. It forms, draws and spins easily.

#### 11. Cartridge Brass or "70-30."

This alloy is made of 70% copper and 30% zinc, the highest grade of zinc being used, and contains practically

no lead. Its high ductility makes it a good drawing metal and it derives its name from its use in making deep drawn cartridge shells. It may be used for difficult drawing or spinning.

It is very useful brass and is used for pins, rivets, eyelets, snap fasteners, radiators, cartridge shells, musical instruments and condenser tubes.

This alloy and alloy No. 12, which follows, possess the best combination of ductility and strength of all the brasses. They may be cold worked but not hot worked.

#### 12. High Brass or "2 and 1."

This is the most common commercial sheet brass and contains around 65% of copper and 35% zinc. It is often called "two and one" from the proportions of copper and zinc used. When annealed it is used for deep drawing, general cupping and forming as well as spinning. In the harder tempers it is employed for parts made by blanking, bending and forming.

It is used for ordinary "yellow brass pipe," auto reflectors, radiator cores, springs, screws, grill work, chain and drawn shapes.

#### 13. Leaded High Brass.

This brass contains 65% copper, 33½% zinc and 1½% lead and is a typical leaded brass sheet. The lead improves its machining and punching qualities.

It is formed by bending accompanied by machining and does not draw too well. It is used for kick plates, channel plates, clock and watch backs, lighting fixtures, etc.

A variation of this mixture is "clock brass" which contains 62% copper, 36% zinc and 2% lead. This mixture punches cleaner than high brass. It can be cut and blanked with clean sharp edges and is especially adapted for such parts as clock gears. It will withstand only slight forming and cupping.

#### 14. Free Cutting Rod.

This alloy contains 62% copper, 35% zinc and 3% lead and is a typical brass rod alloy. The lead content makes it machine freely. It can also be extruded. It is used for screw machine parts and extruded shapes.

#### 15. Forging Rod.

This mixture contains 60% copper, 38% zinc and 2% lead and is a typical brass forging alloy. It is used to make hot forgings such as faucet handles, shower heads and miscellaneous forged machine and ornamental parts.

#### 16. Muntz Metal.

This alloy contains 60% copper and 40% zinc. It has fair strength but low ductility. It can be hot rolled and cold rolled and is usually used for making large sheets. It is used instead of high brass (No. 12) on wide sheets if the surface finish is not too important.

It is used for condenser tubes and heads, ship sheathing, perforated metal, brazing rod, valve stems and architectural work.

*Continued on page 60*

# Buying for the NEW YORK WORLD'S FAIR 1939

DIFFERING IN MANY respects from the problems normally encountered in a continuing business enterprise is the job of buying for a project like the New York World's Fair 1939, Inc. Here is an undertaking of impressive proportions. It includes the development of a 1200-acre tract of marshy land on the Flushing Meadows, fifteen to twenty-five minutes from Times Square; the erection of about 300 buildings, for some of which—like the Trylon and Perisphere of the symbolic theme group—no architectural or engineering precedents exist; the organization and equipping of a staff that will number 35,000 persons at the peak of activity; and all sorts of provisions for accommodating a throng of visitors that will probably exceed the attendance at any previous exhibition of the sort. More than a year in advance of the opening date, the magnitude of the project may be judged by the fact that special Post Office facilities and a World's Fair telephone exchange have already been installed.

The equipment and material purchases alone will amount to twenty or twenty-five million dollars during the pre-Fair period, exclusive of purchases that are separately handled by Federal, State and Municipal agencies, contractors, exhibitors and concessionaires. The comprehensive nature of the exhibition, the problems of construction, commissary, maintenance and the like, lead naturally to a diversified supply list comparable to that of the most intensive and complicated business undertaking. It requires three years of intensive preparatory work for a scheduled operating period of about six months, and after that will come the necessity of practically complete liquidation—a factor that has an important and direct influence on buying policies.

The organization that has been set up to carry out this immense plan is a non-profit corporate body, following the general framework of a business corporation, except that no capital stock exists, funds being provided solely through bond issues which are to be redeemed at the conclusion of the Fair, and any profits that may accrue are to be distributed among State, City and charitable agencies according to a prearranged agreement. There has been very close cooperation with Federal, State and City governments from the outset, particularly in the leasing of the grounds, which are being filled in and graded by the City and will be developed as a public park after the Fair.

## Purchase Organization

The operating organization contains all of the usual departments found in an industrial or commercial enterprise—financial, accounting, engineering, construction, legal, publicity, purchasing and the like.

The Purchasing Department was set up in May, 1936, almost three years before the scheduled opening of the Fair. Starting as a one-man department at the general offices in the Empire State Building, New York City, it has expanded in proportion as the work has progressed. In August, 1937, the purchasing office was moved to the scene of operations, and now occupies a suite on the second floor of the Administration Building, the first structure to be completed for use on the Fair Grounds.

The work has not only expanded, but it has gradually changed in character as the Fair has progressed. For a few weeks at the beginning, it was largely a matter of procuring furniture, stationery and printed forms. As soon as construction and development work got under way, the purchase of equipment, ma-

**NO. 7**  
in a series of case studies  
outlining the actual organiza-  
tion and procedure in repre-  
sentative purchasing depart-  
ments.

terials and supplies became of major importance. This phase is now approaching its peak activity, and requires a staff of sixteen people—a figure which may be slightly increased in coming months. Meanwhile, the work of receiving, storing and issue of materials is rapidly growing, and this has recently been set up as a department of the Purchase Division. Currently, seven persons are engaged in this work, but the force will have to be built up to perhaps some fifty employees as the activity gathers momentum.

The Purchase Division is charged with the procurement of all materials used by the Fair corporation. It does not have any direct concern with the materials for those parts of the construction program which are being handled by private contractors (on contracts let by the Engineering Department), or with the buildings to be erected by exhibitors and concessionaires. However, it does have a very keen interest in cooperating with all these parties as a means of keeping operations up to schedule, and particularly in handling the receipt of large quantities of materials, often similar in nature, but consigned to the account of these various interests and requiring delivery at a specific location on the grounds. There would be a possibility of great confusion and expense in rehandling if this receiving were not properly and efficiently organized, and the space factor will increasingly become a problem as construction work progresses.



RICHARD W. GREVE, Director of Purchase

The organization also looks forward to a further change in the situation during the period of the Fair itself. There will then be the necessity of instantly available and efficiently issued maintenance supplies of all kinds, cleaning materials, electrical and plumbing supplies, tickets, uniforms for several thousand employees and the thousand-and-one details incidental to the smooth operation of the complicated plant. The purchasing staff has already accepted the fact that during the summer of 1939, theirs will be virtually a twenty-four hour responsibility.

The Division is headed by a Director of Purchase, who reports to Commander Howard A. Flanigan, Administrative Assistant, and through him to the President of the Corporation. The situation is particularly fortunate in that the Hon. Grover A. Whalen, President, has not only made it a point to work closely with the Purchasing Department, but is thoroughly appreciative of the problems and implications of purchasing policy and familiar with this phase of management. He and Mr. Greve, the Director of Purchase, were associated in the Schenley Distillers Corp., and prior to that time each had a background of department store ad-

ministration. As a result of this somewhat parallel business experience, they have a common approach to the present problem and there has been complete and cordial cooperation at every step of the program.

A Purchase Committee, consisting of the Financial Director, the Assistant Chief Engineer, and the Director of Purchase, serves in an advisory capacity to the management on questions of buying policy and long range considerations.

#### Personnel

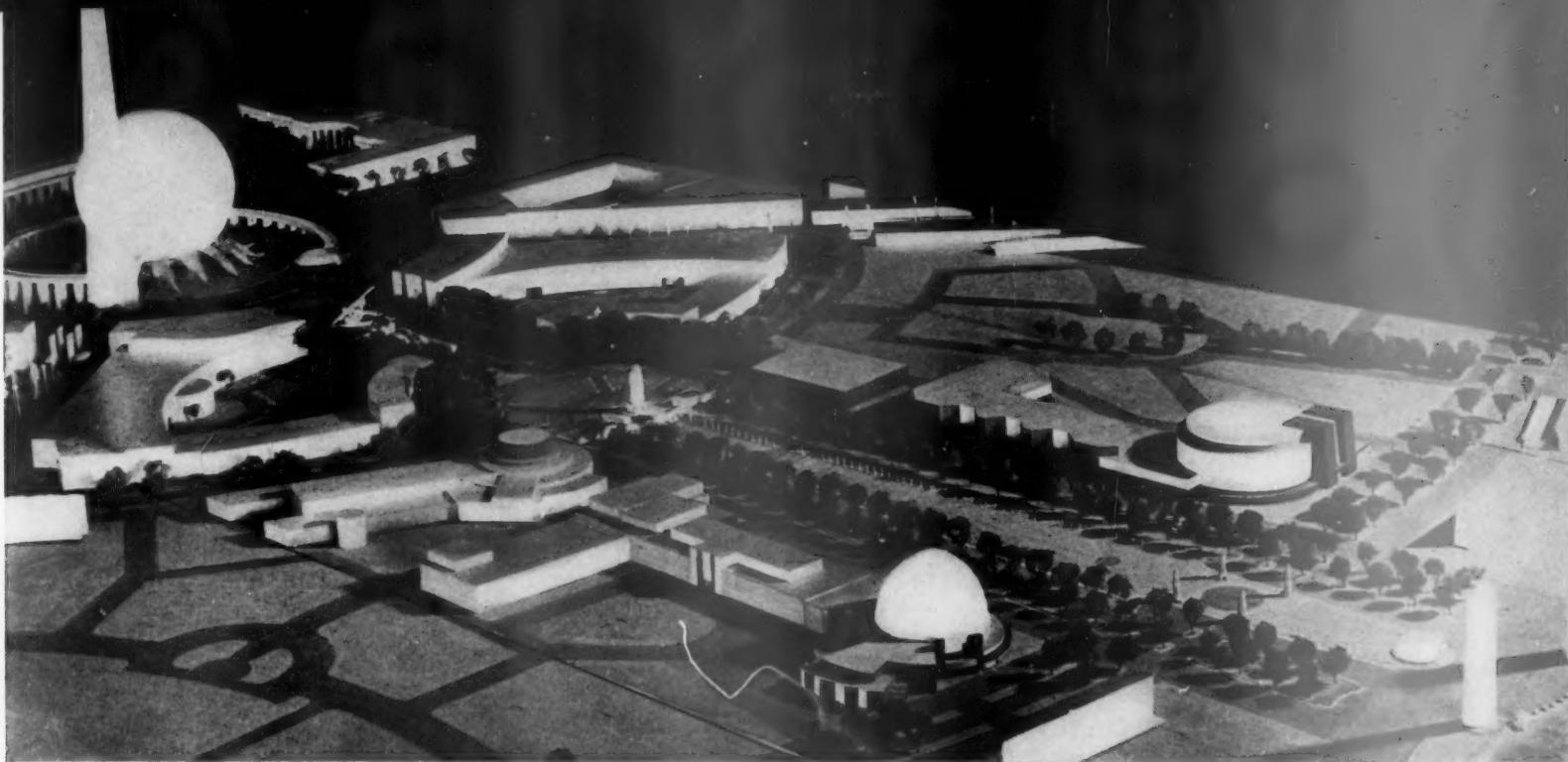
The purchasing staff for this highly concentrated buying job has been recruited from among mature and experienced purchasing executives.

Richard W. Greve (pronounced Grevay'), Director of Purchase, is a graduate of City College of New York, and has taught accounting at Columbia University and City College. An industrial engineer by profession, his work has been largely in the purchasing field for more than twenty years. For ten years he was with Ladenburg, Thalmann & Co., bankers, buying for their associated companies in mining and industrial plants. R. H. Macy & Co., invited him to systematize and install cost systems in their extensive workrooms and factories, then to re-

organize the purchasing department—an assignment that led to another ten years as Director of Purchase for the company, in charge of the buying and distribution of supplies and supervision of salvage operations. He next reorganized the purchasing set-up of Schenley Distillers Corp. at their headquarters office and various plants, and had briefly returned to private consulting practice when he was called to take over the purchasing for the New York World's Fair 1939, Inc. In specific preparation for the present assignment, Mr. Greve and other Fair officials made an intensive personal study of methods used in the Dallas and Cleveland expositions of 1936. His responsibilities at the Fair include executive direction of the department, contact and conference with other divisions, and control of purchasing policies.

G. E. Smith, Buyer, was for thirty-five years with the International Paper Co. Following nine years of practical mill experience, he was appointed traveling auditor, checking stocks and equipment at the plants as direct representative of the General Manager. He served for six years as Assistant Manager of Purchases, and was then advanced to the office of Manager of Purchases for the company's thirty-one mills in the United States and Canada and for a number of subsidiary companies. He occupied this position for eighteen years. In the World's Fair organization, he is buying lumber and piling, steel, hardware, machinery and construction materials.

J. F. Kenny, Buyer, is a graduate electrical engineer, from Pratt Institute. After a period as apprentice engineer with Westinghouse, he became traveling electrical inspector for the U. S. Government during the construction of the Panama Canal. Upon the completion of this project, he went with the General Electric Co., and then during the World War he was placed in charge of repair shops for the Air Service, A.E.F. Since the War, he has been Purchasing Engineer for Arnold & Co., engaged in procuring equipment and complete plants for industrial opera-

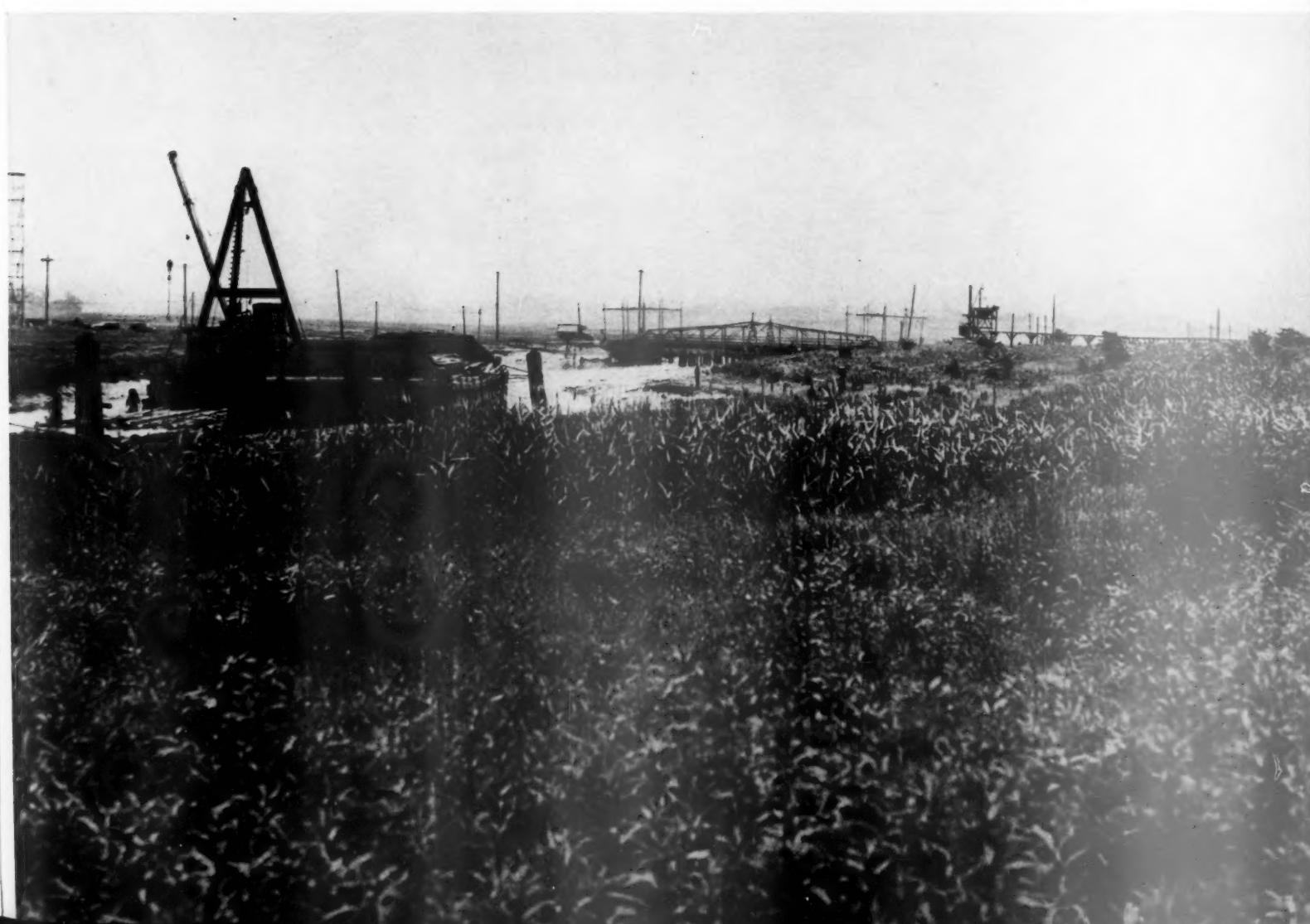


tions in the Far East. Today he buys not only all electrical supplies for the Fair, but furniture, landscaping materials, and a large variety of miscellaneous products.

C. J. Otis, in charge of receiving and stores, received an accounting education at Pace Institute and New York University. In 1913 he joined

the staff of the Spreckels Sugar Corp., in cost and statistical work, and ten years later was assigned to purchasing for that company and its subsidiaries, the Syrup Products Corp. and the Federal Cooperage and Bag Corp. For the past two years he has been associated with the Irving Trust Co. of New York

The scale model shown above, representing the mall and a small portion of the exhibition space, strikingly visualizes the transformation to be effected on the marshy tract, shown below as it appeared in 1936.



NEW YORK WORLD'S FAIR INCORPORATED		PURCHASE REQUISITION	
Please order the following Materials or Services for:		Date _____	Requisition No. _____ Purchase Order No. _____
Division _____ Department _____ Section _____		Last 1 Month _____ On Hand _____	Unit Price _____ Amount _____
Quantity _____ Description—Give exact specifications, catalog reference or sample _____		Form Y-17-1938-11-11	
NEW YORK WORLD'S FAIR INCORPORATED			
REQUISITION AND PURCHASE ORDER CHANGE NOTICE			
To TREASURY DIVISION, Budget Director			
Please note the following change in:			
Requisition No. _____	Purchase Order No. _____	Original Amount _____	Revised Amount _____
Address _____ Notes _____			
EXPLANATION: PRICE CHANGE <input type="checkbox"/> QUANTITY CHANGE <input type="checkbox"/> PICKED FROM STOCK <input type="checkbox"/> CANCELLED before issuance of purchase order <input type="checkbox"/> SPECIFICATIONS CHANGE <input type="checkbox"/> CANCELLED after issuance of purchase order <input type="checkbox"/>			
OTHER REASONS (Give complete explanation): _____			
Form 1 ORIGINAL—Purchase Dept. working copy. Routing—Send first three copies to Treasury Division.			
PURCHASING DEPT.		PHONE: _____	
REQUEST FOR QUOTATIONS New York World's Fair 1939, Inc. Empire State Building New York City			
THIS IS NOT AN ORDER DATE: _____			
TO: _____ ADDRESS: _____ CITY: _____		9-6000 CORRESPONDENCE TO WORLD'S FAIR 1939 EMPLOYEE IN THE FORM OF PURCHASE ORDERS REFER TO _____	
BIDS MUST BE RETURNED BY: _____ ITEM: _____ FORM NO.: _____ QUANTITY: _____ STOCK: _____ COLOR: _____ SIZE: _____ PACKED: _____ COLATE: _____ PRINT: _____ PAPER: _____ INK: _____ PERFORATE: _____ PLATE: _____ ENGRAVING: _____ RYLING: _____ PUNCHING: _____ LITHOGRAPHING: _____ DIE CUTTING: _____ EFFECTS: _____ REMARKS: _____ THE QUICKEST TIME WANTED: _____ TERMS: 25 TO DA DATE: _____ Form 2		BUREAU OF PURCHASE Increased Expenditures Approved: Department or Division Head Administrative Asst. to the President Bureau of Purchase New York World's Fair 1939 Incorporated	
Account No. _____ Title Space for Treasury Div. Budget Dept.			
ORIGINAL—Purchase Department Copy			
NEW YORK WORLD'S FAIR 1939 INCORPORATED EXECUTIVE OFFICES EMPIRE STATE BUILDING NEW YORK CITY			
QUOTATION SHEET BUREAU OF PURCHASE DATE: _____			
For the materials hereinabove mentioned will be received and opened at _____ M. on the _____ day of _____ By Bureau of Purchase, New York World's Fair 1939 Incorporated. ALSO ARE TO BE DELIVERED AT _____ NET PRICE PER UNIT OF MEASURE AND GIVE ITEM TOTAL AND GRAND TOTAL OF YOUR QUOTATION FED MUST INCLUDE ALL DISCOUNTS ALLOWED, IF ANY. TENOR RESERVES THE RIGHT TO REJECT ANY OR ALL QUOTATIONS OR TO ASS OR ITEM. HIGHEST QUOTATION CAN BE MADE. If materials hereinabove mentioned, return this sheet with a notation to that effect. Otherwise your list.			
ARTICLE BID PRICE PER UNIT ITEM TOTAL			
Form 11 X 11 1/2 IN P.O.S.C.			
NEW YORK WORLD'S FAIR 1939 INCORPORATED Stores Requisition on _____ Location _____ Date _____ 19____ No. _____ For Department _____ Section _____ Charge to Account No. _____			
Quantity Unit DESCRIPTION (Should include specifications catalog reference or sample) Unit Cost Amount			
NY WORLD'S FAIR INCORPORATED PURCHASES ROUTE THE BILLS AND SEND BY THE BULK AUTHORITY			
Total _____ Received by _____ Approved by _____			



World's Fair Purchasing Staff

Left to right: J. B. Ponvert, C. J. Otis, R. W. Greve, G. E. Smith,  
Miss M. R. Caparell, J. F. Kenny

City, engaged in the liquidation of various properties.

Miss Mildred R. Caparell, who attended Hunter College and was formerly with the Insull organization, serves in the dual capacity of office manager, supervising the work of the clerical staff, and buyer of stationery and printing.

J. B. Ponvert, formerly a lieutenant in the U. S. Navy, is the department's "trouble shooter," acting as the representative of the Purchasing Department in the coordination of its work with various other divisions—an assignment requiring not only an intimate knowledge of the supply work, but diplomatic talents of a high order as well.

#### The Time Element

Most important single consideration in the buying program is the time schedule that must be rigidly observed. The Fair will open on April 30th, 1939, but is to be completed a month prior to that date. To this end, a very complete schedule and progress chart is maintained in the construction department. All phases of the work, including purchasing, are coordinated in this program and are constantly checked against it. At the present time, with eight buildings com-

pleted or in progress, and with a staff of about eight hundred persons busily at work, the program is running ahead of schedule—a fact which is gratifying in that it will permit greater pressure upon exhibitors and others to bring their own work to completion on the same prompt basis.

As a means of impressing every one in the Fair organization with the importance of this time factor, a unique calendar visualizing the slogan "Time Tears On" has been developed and will be prominently displayed in all offices from now till the opening of the Fair. It consists of a large fifteen-month calendar, covering the period from January 1, 1938, through the scheduled date for completing all work. This has been superimposed upon a handsomely colored reproduction of the completed Fair. The calendar is perforated so that each day's date may be torn off as it elapses, thus disclosing another small portion of the picture underneath, and visually indicating the proportion of the schedule that has been completed and that which remains to be accomplished within the limited time. This striking reminder is further emphasized by a red arrow under each date, printed to indicate the number

of days still remaining, from 455 days on January 1, 1938, down to 1 day on the final date.

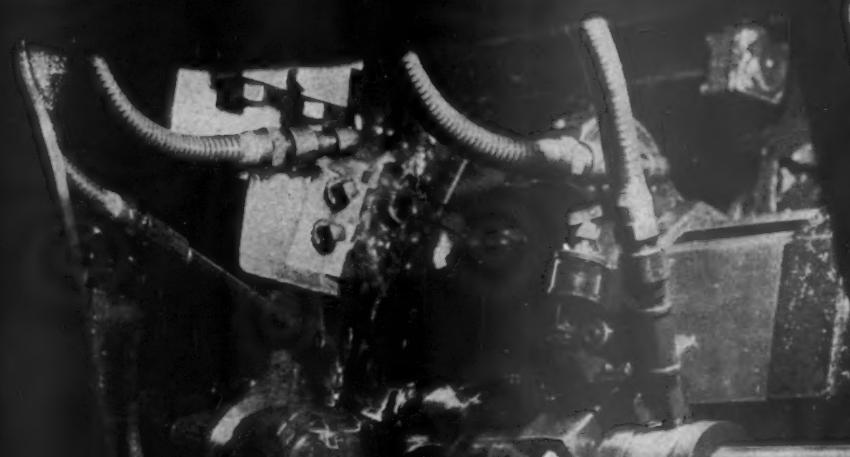
In the purchasing work, this schedule is kept ever in mind, and on as many items as possible the arrangements have been definitely made to have materials available as needed. Thus in the purchase of shrubbery, top soil, fertilizer, etc., for the landscaping work, contracts have been made well in advance, with deliveries subject to the order of the landscape superintendent, in accordance with a detailed planting schedule, which takes into consideration the pertinent seasonal factors, the time required for establishing the plants in their new environment, and the like. Construction materials are similarly scheduled as building plans are completed and approved.

#### Liquidation

Another factor of major importance in shaping purchasing policy is the necessity for liquidating all equipment at the end of the Fair period. Quite aside from construction methods, which are a matter of engineering design, this circumstance applies to practically every item of purchase. It is impossible to set up any normal schedule of depreciation when a limited period of use is contemplated. Consequently the policy is to set up a predetermined liquidation value wherever possible.

In the matter of office furniture and accounting equipment, for example, it has been done by working closely with the manufacturers, who have a decided interest in avoiding the possibility of finding a large quantity of slightly used pieces dumped upon the market at distress prices at the closing date. By making arrangements for a turn-in at prearranged rates, it has frequently been found advisable to use furniture of a higher standard than might otherwise have been considered for this temporary use, because of its superior resistance to depreciation. The net result is a cost in many instances substantially below the corresponding rental

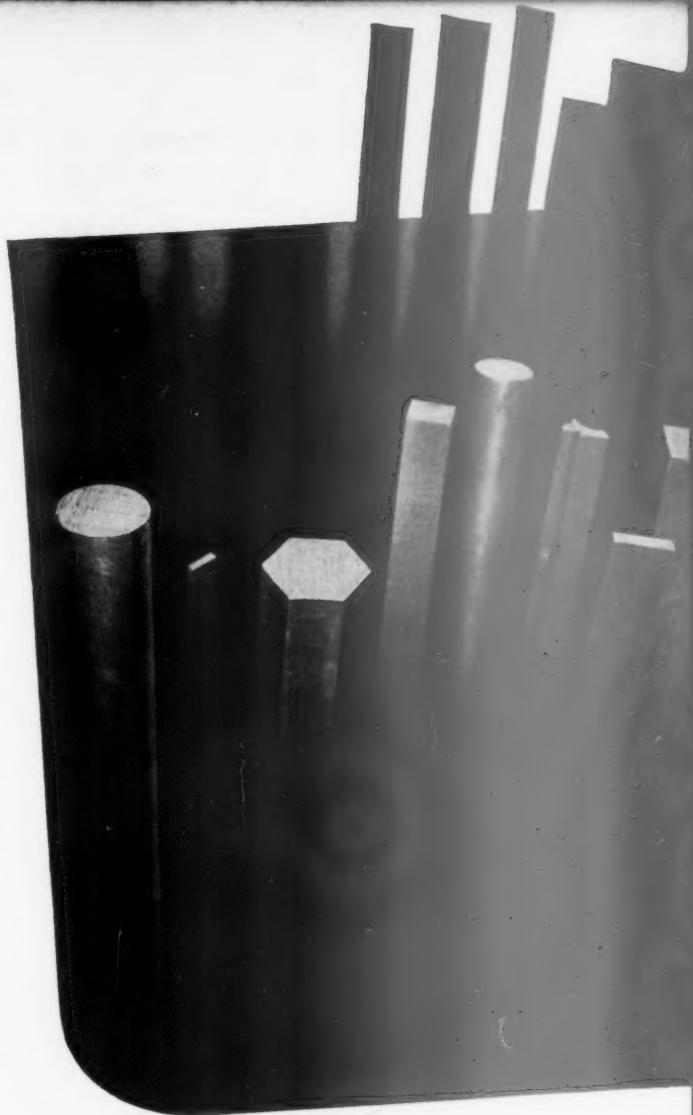
*Continued on page 42*



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# THE MARKET PLACE



*A quick review of the market  
noting major developments in  
supply, demand and prices of  
selected basic commodities*

## Supply

### BURLAP

U. S. STOCKS OF BURLAP at the end of November amounted to 208 million yards, plus 123 million yards afloat. This is 5 million yards down from the figure of a month earlier, but still represents  $4\frac{1}{2}$  months' supply.

### COAL

PRODUCTION OF BITUMINOUS coal expanded sharply during the first half of the month to meet orders placed in anticipation of the minimum price regulations which became effective on the 16th. From 7,206,000 tons in the last week of November, output went above 10 million tons, then slackened again in the second half as industrial demand virtually disappeared. Industrial consumers' stocks are high, and the resultant accumulation of slack at the mines is a real problem for producers.

### COPPER

WORLD STOCKS OF REFINED copper increased 30,680 tons to 413,846 during November, U. S. stocks being up 39,834 tons to 221,676. This is the highest tonnage on hand since July, 1936, and represents considerably more than three months' supply. U. S. producers are reluctant to curtail operations much further at this time, and are looking to a revival of demand to bring the situation into balance shortly.

### COTTON

THE GOVERNMENT'S DECEMBER crop estimate of 18,746,000 bales was up  $\frac{1}{2}$ -million bales from the November forecast, and is based on the phenomenal yield of 264.6 pounds per acre. A curious angle is that federal holdings of the staple (now totaling more than 4,300,000 bales) exceed the interest of the trade.

## Demand

U. S. CONSUMPTION CONTINUED to decline in November, being down 11 million yards from the October level. Demand was lacking, and trading practically at a standstill.

INDUSTRIAL DEMAND IS very slow, owing to curtailed operations in many fields and accumulations of coal piles prior to the minimum price schedules. In some large consuming industries, it is estimated that pre-code purchases are sufficient to last well into the spring.



## Market

BURLAP PRICES AT the end of November were at a new low for the year to date, but two further reductions in December carried quotations to an all-time low, under the cost of production and considerably under even world depression prices.

ADDITIONAL PRICE DETERMINATIONS were issued early in December, so that minimums in practically all fields were to become effective by January 3. There was much price shading up to mid-month as producers sought volume. Since then, there has been considerable confusion in a list that is theoretically fixed. Advances averaging 15% to industrial users, and amounting to as much as 60% on nut and slack, have been vigorously challenged, and whatever the logic of the new determinations, the schedule presents enormous difficulties for the operators as well as purchasers.

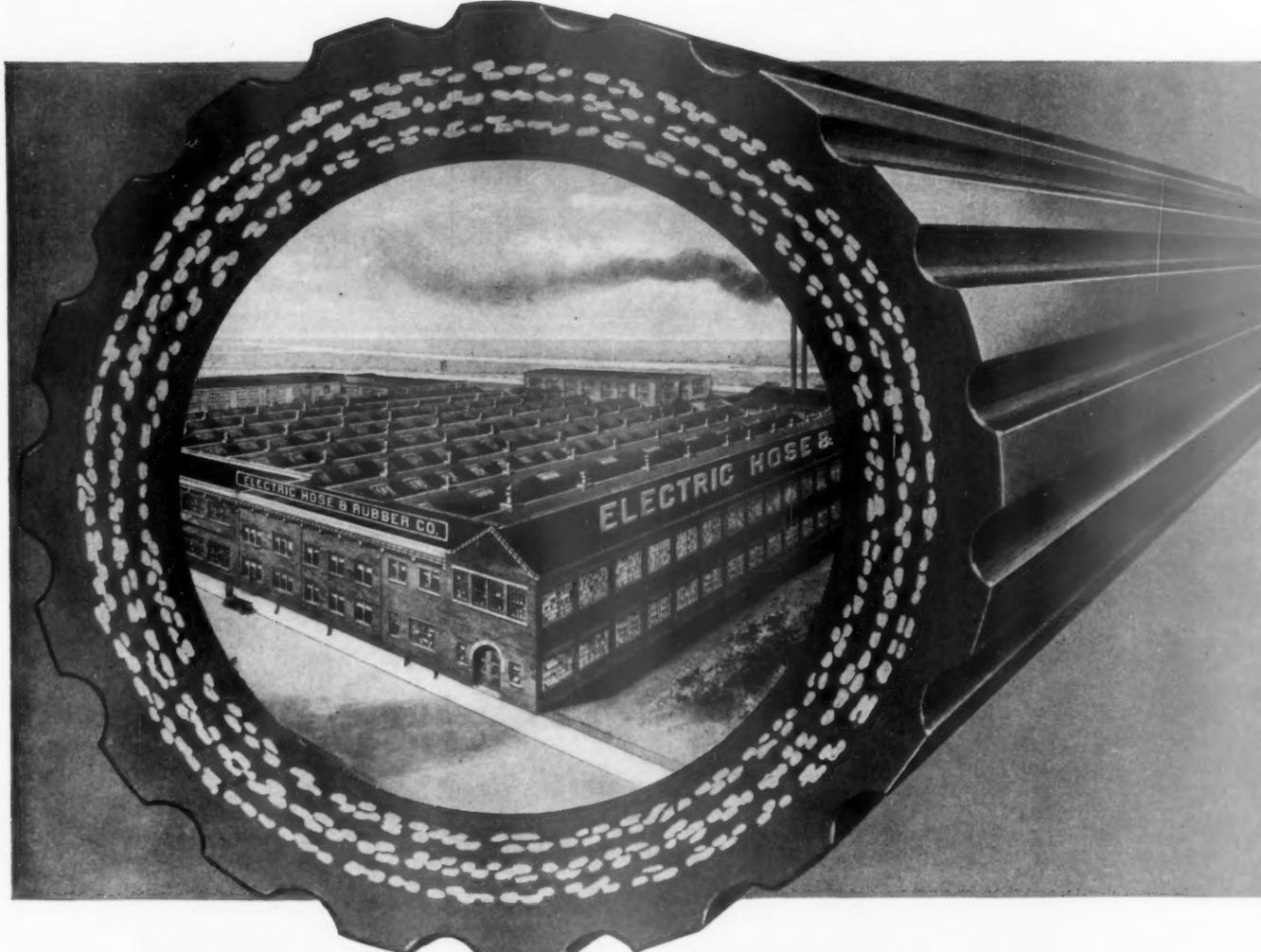
DECEMBER SALES WERE somewhat better than in November, and a substantial proportion of the business was for immediate or January delivery, which was highly encouraging to producers as indicating a close inventory in consumers' hands. Demand showed itself rather sensitive to fluctuating prices.

COPPER PRICES WERE exceptionally unstable during December. The dual price structure, with custom smelters fractionally lower than primary producers, continued in effect. The lower quotations were down  $1\frac{1}{2}$ -cent to  $10\frac{1}{2}$  at the beginning of the month, briefly touched 10 cents as producers met the challenge, then recovered, settled to  $10\frac{1}{4}$  and then to  $10\frac{1}{8}$  as producers held to 11 cents. European prices were fairly firm around the 10-cent level.

TEXTILE ACTIVITY BROADENED during the month and was decidedly brisk in the second half, with gray goods sales consistently exceeding production and many mills booked up through February. The strength of the raw cotton market and the prospect of higher replacement costs lent confidence to the industry generally.

COTTON PRICES FIRMED gradually through December to 8.40, and closed around 8.29, a gain of 32 points for the month. Basic grades of textiles advanced moderately and held firmly to the higher levels presenting the strongest picture in several months. Cotton yarns were slightly easier in tone.

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## Supply

### IRON and STEEL

AS EXPECTED, steel production declined during December, as the usual year-end slackening of activity for inventory and repair accentuated the current low rates. For the industry as a whole, the operating rate went down to 19.2%, a five-year low, and the December average was in the neighborhood of 23%. It is generally felt that this marks the extreme low point of recession, and predictions are for a 30% rate to be attained in January, and an average of 35% for the first quarter of 1938. Pig iron activity is very low. Consumers' inventories of metal are reported heavy.

### LUMBER

DECEMBER, normally a low month in lumber production, witnessed a sharp curtailment in output to the year's low—41% of the 1929 weekly average. The move was logical and fully expected after twenty successive weeks in which output had exceeded both new orders and shipments. The new schedule brings the industry more into balance, as, with the exception of the holiday week, new orders were somewhat greater than output in December, the first such situation since May. Total figures for the year show output about 2% ahead of the 1936 record. Gross stocks of lumber held by mills declined during the month, after an uninterrupted rise of many weeks.

### NAVAL STORES

STOCKS OF NAVAL STORES continue heavy in the absence of any consistent demand. The supplies are not excessive, but being necessarily measured in terms of consumption and demand they are more than ample. Reports from other producing countries reveal a statistical picture that is on the whole less favorable. No authentic figures have been released concerning the progress of the conservation program.

### PAPER

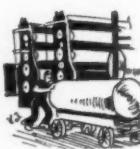
THE PRODUCTION INDEX of paper and paperboard declined further in December, but the rate of decline had materially diminished, and the average for the entire year will be close to that of 1936. Canadian newsprint operations are down to about 60% of rated capacity, being gaisted to current demand and aiming to absorb the present mill surplus over the next three months.

## Demand

CONSUMPTION IS BELIEVED to be in excess of both production and sales. New orders are relatively light in volume, but are firm and carry specifications, representing a fairly healthy miscellaneous demand. Chicago sales have been the best since summer. Structural items and sheet have been in less demand, but rails are promising and there are good requirements from the shipbuilding industry. Inquiry and purchases of scrap are improving in volume, with considerable European interest.



BOTH SHIPMENTS AND new orders were in better volume than for some time past, but not enough to be regarded as a definite upturn. Dealers are buying more freely, but the major outlets are still very uncertain. Factory sales of furniture follow closely the trends in residential construction, and with the drop in new home building the furniture demand also declined, allowing for some lag due to deliveries of unfilled orders.



DEMAND HAS BEEN generally quiet. Pulp requirements are sharply off. Newsprint business is 5 to 10% below last year's levels. Book paper has been fairly strong on good purchases for advance requirements. Exports for the fourth quarter expanded in virtually all grades except wrapping.

## Market

EARLY IN THE MONTH, galvanized sheets were down \$5, but the reaffirmation of tin plate quotations for the first quarter had a strengthening effect on the entire list. The industry holds that present schedules are amply justified by costs. The chief disturbing factor now is the possibility of a general mark-down in the automotive field, which might entail a reduction of inventory values and consequent pressure on producers. Scrap prices showed consistent strength during December, advancing from \$13 to \$14.50, with a few \$15 sales reported in the closing days.

LUMBER PRICES GREW firmer in December. The recovery in hardwoods, which was already apparent a month ago, continued, bringing prices to a point only fractionally below September levels. The advance in softwoods was less pronounced but showed definite indications of increasing strength. Southern pine went from 20.68 to 20.84 early in the month and then settled at 20.76, a slight but encouraging gain. With the statistical situation more favorable than at any time in the second half year, those in the industry are confident that the low point of the present movement was reached in November.

TURPENTINE PRICES registered four successive declines of  $\frac{1}{4}$ -cent in the first week of December, then remained steady at 31 cents (New York) in a featureless market over the balance of the month. Rosins were lower in the first two weeks but firmed at mid-month. From that point on, with improving demand, the common and medium grades advanced steadily but failed to regain the levels that prevailed at the beginning of the month, showing losses of from  $7\frac{1}{2}$  to 60 cents per barrel. The fine grades were in a better position, advancing from  $22\frac{1}{2}$  cents to \$1.40 per barrel.

THE PAPER PRICE LIST, which has been holding steady for several months, showed the effects of curtailed demand in December. Quotations on kraft, tissues, mechanical and chemical pulp, and waste papers, all declined moderately. The new \$50 price on newsprint became effective on January 1.

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HOWARD HERST

## Supply

### PETROLEUM

**I**NFLUENCED LARGELY BY SHARP curtailment in the East Texas field and a trial of the Sunday shutdown, crude oil production was held down during December. Gasoline stocks are exceedingly high—enough to cause serious concern in the industry and trade. Fuel oil stocks are lower.

### RUBBER

**W**ORLD AND U. S. STOCKS of crude rubber advanced sharply in the closing months of 1937, as production and shipments were maintained at relatively high rates while consumption fell off to a marked degree. Just three years ago, in January, 1935, world stocks were at their peak of 765,118 tons, but under the current restriction plan there was a steady reduction to 463,159 tons last May. U. S. stocks reached their low point two months later. Since that time, however, the direction has been reversed, and with gaining momentum world stocks have reached the neighborhood of 560,000 tons, U. S. stocks close to 240,000 tons, substantially more than six months' supply at current rates. Malayan dealers' stocks are slightly down, as a January 1 increase in freight rates encouraged prompt shipment. Under the circumstances, the reduction of export quotas to 70% for the first quarter of 1938 is not likely to make itself felt until the latter part of that period.

### TIN

**E**XPORT QUOTAS FOR TIN, which had been set at 110% of standard for the last 8 months of 1937, were slashed to 70% for the first quarter of 1938. The reduction was actually not as severe as the figures would indicate, as tonnage produced and exported in recent months has been in the neighborhood of only 85%. Coincident with the new quota, the arrearage of about 11½ thousand tons was surrendered by Bolivia, Belgian Congo and Indo-China, and members of the cartel agreed to carry over into 1938 only 8½ per cent of their arrears, canceling the balance. The new arrangement will provide slightly less than 35,000 tons per quarter.

### ZINC

**P**RODUCTION OF ZINC WAS curtailed each successive month of the fourth quarter, but surplus stocks have rapidly grown to more than 40,000 tons in December, a supply larger than a year ago and, for the first time in 1937, representing more than a month's shipments.

## Demand

**C**ONSUMPTION OF PETROLEUM products is headed toward a new winter-season record, and for the second successive year the expanding use of heating oils, plus well sustained use of motor fuel, is making the winter the most important season of the year for this industry.



**N**OVEMBER RUBBER CONSUMPTION in the U. S. fell off to 33,984 tons, and figures for December will be from 5 to 10% below that record, bringing the year's total to about 545,000 tons, or 5% short of the 1936 record total. Tire production has been steadily contracting from the rate of 16,420,716 units of the second quarter; third quarter production was down to 12,658,848 units, and the fourth quarter will probably be below 10 million units for the first time since 1934.

## Market

**P**RICe DEVELOPMENTS OF the month—Pennsylvania crude down 15 to 18 cents a barrel; mid-Continent crudes weak, particularly after the Sunday shutdowns were discontinued; kerosene up 1/8-cent at mid-Continent refineries; oil tanker rates higher in the Gulf trade.

**R**UBBER PRICES, WHICH WENT below 15 cents in November, rallied strongly in the first week of December. Sustained by active factory buying interest, the spot quotation advanced to 15½ and held firmly at that level for about ten days. When factories again retired to the sidelines, prices drifted aimlessly as for several months past, and under the influence of profit-taking sales and high supply statistics, sagged to 14½. At the close of the month there was a slight recovery from this point. The International Rubber Regulation Committee is on record as considering this level less than satisfactory to producers, and with 1938 consumption estimates down from 1937, it is probable that some further change in quotas will be undertaken to strengthen the price structure.

**W**ORLD USE OF TIN has increased by 21,000 tons, or about 13½%, as compared with the preceding year, and is currently about 180,000 tons annually. U. S. consumption was up nearly 15,000 tons, or 20½%, for the year, but the trend has been downward in recent months, and demand was not appreciably stimulated by the cut in export quotas, which merely served to adjust supply to prevailing rates of use and to remove the threat of topheavy potential production which might depress the market. Demand has been relatively sluggish, responding principally to the lower price levels of the closing days.

**T**IN QUOTATIONS, WHICH WENT to the year's low of 40¾ cents in November, turned buoyant in December and climbed to 44¾ before the middle of the month, responding strongly to the quota cut announcement. However, as is frequently pointed out, the important factor in tin markets is demand, and not supply, and when demand did not support the higher price levels, there was a steady recession to 41½ cents at the close of the month, where a satisfactory volume of trade brought firmness to this very unstable commodity.

**S**LAB ZINC QUOTATIONS were reduced to 5 cents a pound in the first week of December, and held firmly at that level for the balance of the month. Prices of zinc ore were down \$1.50 a ton, to a range of \$31.00-32.00. At the close of the year, new prices were announced on zinc base die casting alloy, down 3/4-cent to 8 cents.

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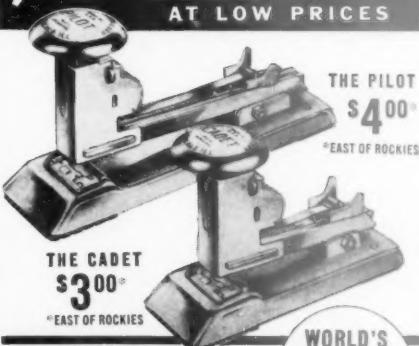
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# F. O. B.

## (Filosophy of Buying)

**I**N A RECENT ARTICLE on the 40-year age limit in business, George Renard sounds the theme that "Nothing takes the place of experience." But after battling twelve rounds to no decision with the proofreading department during 1937, F.O.B. still prefers the copy-book version: "Practice Makes Perfect." *Stet.*

You say depression,  
And I say recession.  
Let's call the whole thing off.

**W**E CAN UNDERSTAND the Big Boss getting peevish when the P.A. makes a slip in inventory policy. Nevertheless, once more we are glad that we work in U. S. A. and not in U. S. S. R. A Christmas Day dispatch of the Associated Press, with a Moscow date line, reports sixteen death sentences for a variety of offenses, three of which gave us an uneasy start. One of the crimes was putting in a stock of buttons that nobody wanted; a second was the failure to put in adequate stocks of goods for which there was a demand; the third was storing goods in a cellar warehouse where they were subsequently ruined by a flood. Long or short, the buyer gets it in the neck. And of course there can be no "acts of God" in the Soviet Union.

The news from Washington is that the Department of Justice is out to get the price fixers in a good old-fashioned trust busting spree in the very best manner of Roosevelt I. Having just completed the job of fixing coal prices for the third time in four years, the boys simply had to have an outlet for their energies.

Or perhaps this is an investigation to learn what it is that makes a real price control plan tick, in the hope of making the coal schedules stick this time.

**W**E LIKE OUR JOB, but we are forced to yield the palm in this respect to a recent correspondent who concludes a long and ardent sales appeal by assuring us that "The price is any you say—it does not affect my work, which I am in for the sheer joy of it." A poor prospect, we should say, for a C.I.O. organizer.

### F. O. B.'s. Forum Sheet on Business Conditions

*(Guessed Economist: Prof. Gideon Chartz)*

*Dr. Chartz, we want the benefit of your insight on the outlook for 1938.*

Pardon me, I have no insight information. Ha, ha! But seriously, I prefer to stay on the outside; it gives one a better perspective.

*Perspective on what, Doc?*

On perspective business conditions.

*I see. And what, in your opinion, will be the outstanding characteristic of the period just ahead?*

I have a very definite opinion on that point. The conclusion is inescapable that the fundamental underlying factor in the current situation is a well-founded element of uncertainty.

*To go from the general to the particular, what is your recommendation on buying policy?*

My answer to that is, categorically, yes and no.

*Will you kindly develop that point a little farther.*

It is very simple. We are in a highly selective market. The only real problem is to apply the Yes and the No in the right places. That is a matter of judgment.

*Specifically, what would you advise the purchasing agent to watch?*

His step.

*That is good practical advice, I am sure.*

Well, let's keep it academic; it's safer.

*Can you summarize the general opinion?*

Yes, indeed. I have just compiled the views of fifty competent and experienced executives. You can have it in their own words.

*But I find that rather confusing. Each one has a different slant, and when you put them all together they seem to cancel out.*

Naturally. But take the constructive view—certainly it gives you a wider choice. And after all, they can't all be wrong.

*That's what you think, Doc. Now just one more question. Would you care to hazard an opinion on the price trend over the first quarter?*

That depends entirely on what odds you are offering.

*Thank you, Dr. Chartz.*

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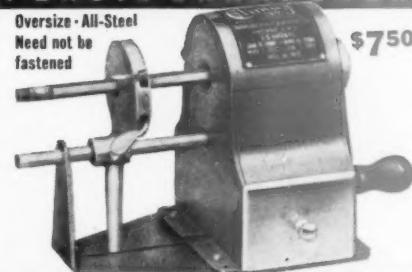
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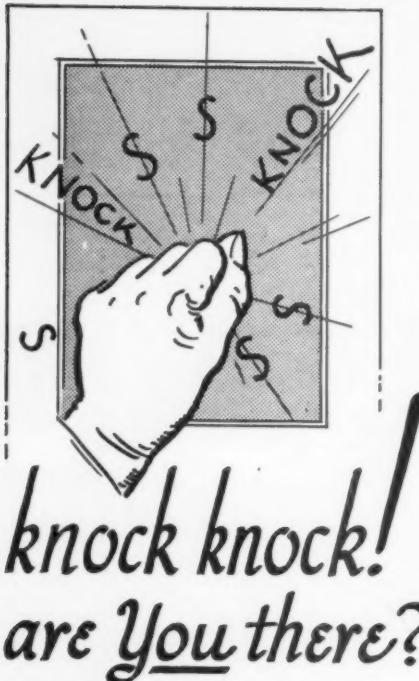
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ENGLAND

MILAN,  
ITALY

SYDNEY,  
AUSTRALIA



## Buying for the New York World's Fair

(Continued from page 31)

cost of inferior equipment, and greater satisfaction during the meantime.

In other lines, particular weight has been given to accepted standards and to local building codes where the substantial salvage market for hardware, plumbing and electrical fixtures will be found. On fire protection equipment, the thread sizes and standards, nozzle types, etc., of the New York Fire Department have been observed. Saddles and blankets follow the specifications and requirements of the New York Police Department.

### Buying Policies

There is intensive competitive bidding on all purchases, and the same prudent considerations for efficient buying prevail as are found in any efficient commercial undertaking. The quasi-public nature of the Fair, the strict budgetary control, and the quarterly audit, make this even more imperative as evidence of sound and careful administration.

In a few instances, seeking competition in a large project of this special nature has to be discreetly conducted because of the possibility of an artificially created demand. For example, timber piling, required in the foundation work, has been a large item of purchase. Approximately half a million dollars have been spent to date on this item alone. It is quite conceivable that the broadcasting of this requirement among too many suppliers with requests for quotations, plus inquiries issued by contractors and exhibitors undertaking other construction work at the Fair, would result in a pyramiding of these inquiries into a far greater apparent quantity than the actual requirement, with the result that the buyer would be competing against himself in the market and would be forced to buy at higher levels than are actually justified. On an item such as this, therefore, the policy has been to make an exhaustive

study and to prequalify available sources. Exhibitors and concessionaires are fully advised so that they may be guided in their purchases.

### Procedure

The purchase system and routine have been kept as simple as possible consistent with efficient operation and adequate office records, and are designed to keep paper work and duplication of effort at a minimum.

In making a purchase directly for some department or for a specific project, a purchase requisition is issued in quadruplicate. One copy is retained by the issuing department, and the other three are sent to the Budget Director. If funds are definitely assigned for the purpose, the Budget Director approves and passes two copies along to the Director of Purchase, retaining the third for his own record.

The Director of Purchase allocates the buying assignment to the proper buyer, giving him one copy of the requisition, and the remaining copy goes to the follow-up clerk, who is charged with checking the buyer for prompt action and then, after the purchase order is issued, follows up the vendor for delivery.

After negotiation and securing of bids, the purchase order is made out. There are eight copies of this form, numbered and identified by color. The original and an acknowledgment copy are sent to the vendor, the latter being returned to the Purchasing Department and filed alphabetically. One copy goes to the receiving department, one to the follow-up clerk, one to the accounts payable division of the accounting department, one to the construction superintendent, and one to the internal cost clerk of the construction department. One copy is for the numerical file in the Purchasing Department. On rented equipment, a copy of the purchase order is sent to the insurance department so that a check may be made that the proper coverage is carried on each piece of equipment.

Because of the necessity of observing strict budgetary control and

staying within the limits of funds allocated, any change in a purchase that may affect the budgeted amount, whether on the requisition or the purchase order, requires the issuance of a "Change Notice." This form details the nature of the change, and the reason—whether a change in price, quantity, or specification, whether filled from stock, or canceled before or after the purchase order is issued. It also indicates the revised amount of the order and whether this represents an increase or reduction from the amount originally allocated. If the expenditure is to be increased, the change must be approved by the head of the department or division concerned.

A receiving ticket is made out in quadruplicate for each shipment, and the receipts applying against any given purchase order are summarized on the back of the receiving copy of the purchase order. This copy has neither the quantity nor the price shown thereon, thus requiring an accurate independent check on quantities received.

The stores requisition covers those items which are carried in stock. This classification includes all stationery and forms, publicity material, electrical, plumbing and hardware supplies, maintenance and cleaning materials. There are two forms, one for the stationery items and one for all other supplies. Maximum and minimum quantities have been established on each item, in collaboration with the using departments, but these quantities are constantly subject to review and revision in the light of the increasing tempo of operations and the progress of the work.

#### Conclusion

The Purchasing Department of the New York World's Fair 1939, Inc., affords a striking recognition of the importance of sound buying as an essential function in a major administrative undertaking.

The organization and procedure of this department demonstrate the possibility of adapting basic principles to unusual and constantly changing requirements, and the

flexibility that is inherent in a well conceived system.

Likewise it demonstrates the importance of the personal element in carrying out the purchasing program. Because of the rigid time requirement, there has been little opportunity for training executive personnel to take over responsibilities that must be met with promptness and decision. But experience acquired in buying successfully for other commercial fields has proved to be pertinent and adequate in fulfilling the exacting demands of this large and unique project, effectively and economically.

The crucial test is of course still to come, and the summer of 1939 will hold the answer to this as well as to other questions of administrative success. But the fact that schedules have already been anticipated, and that other departments of the World's Fair organization are finding confidence and satisfaction in the handling of their material problems by the purchasing staff, gives every assurance that this branch of the organization will contribute its full share to the success of the undertaking, both as a spectacular and educational exposition and in the business aspects of the venture.

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# Among the Associations

**Hamilton**—New officers of the **Hamilton Association** have been elected for 1938, as follows: *President*, W. P. Tinsley of Lysaght Dominion Sheet Metal Corp., Ltd.; *Vice Presidents*, A. C. Kay of Firestone Tire & Rubber Co. of Canada, Ltd., and C. R. McNeil of Fuller Brush Co., Ltd.; *Secretary*, C. Barlow of Norton Co. of Canada, Ltd.; *Treasurer*, J. Frank Walker of Frost Steel & Wire Co., Ltd. Mr. Tinsley will also serve the association as a member of the Canadian Council.

**Niagara Falls, Canada**—Officers for 1938 of the **Niagara Peninsula Branch, Hamilton Association**, have been chosen as follows: *Chairman*, W. W. Jefferson of Commonwealth Electric Corp., Ltd., Welland; *Vice Chairman*, J. G. Sexton of McKinnon Columbus Chain Ltd., St. Catharines; *Secretary*, Horace Cluderay of United Steel Corp., Welland.

**Portland**—An educational program sponsored by the **Oregon Association** starts this month. It will consist of a series of six lectures by Edmund C. Bechtold, dealing with the topic, "Practical Psychology as Applied to Business."

**Seattle**—The educational course of the **Washington Association**, completed last month, was attended by thirty-three members of the Association. The schedule consisted of nine lectures, as follows: Prof. Joseph Demmery of the University of Washington "Economics," (3 sessions); Prof. H. G. Rahskopf of the University of Washington, "Practical Speaking," (3 sessions); Dr. Henry A. Burd of the University of Washington, "Letter Writing"; Arn S. Allen, Jr., vice president and sales manager of the Seattle Hardware Co., "A Sales Manager Looks at the P.A.;" Col. Charles S. Albert, attorney for the Great Northern Railway, "Review of Current National Legislation as it Affects the P.A."

## DECEMBER 1

**Tonawanda, N. Y.**—Plant visit of the **Buffalo Association**, at the Spaulding Fiber Company plant.

**Boston**—Plant visit of the **New England Association**, at the Tileston & Hollingsworth Co., Hyde Park, a very modern plant of the oldest paper manufacturing company in continuous operation in the United States.

## DECEMBER 2

**Salt Lake City**—Annual stag banquet given by the Utah Manufacturers' Association for members of the **Utah Association**. A varied program of entertainment was presented.

**San Francisco**—Luncheon meeting of the **Northern California Association**, at the Palace Hotel. Illustrated talk by Ted Lenzen of the engineering department, Standard Oil Co. of California, "Problems of Constructing an Oil Refinery in the Bahrien Islands."

## DECEMBER 3 - 4

**Durham, N. C.**—Meeting of the North and South Carolina section of the **Educational Buyers Association**, at Duke University. Friday afternoon was spent in inspection visits to a large tobacco plant and various points of interest on the Duke campus, including the hospital. Dinner meeting at the Union, O. G. Sawyer presiding. Speakers: Dr. Dudley D. Carroll, dean of the School of Commerce, North Carolina University; A. M. Graham of Winthrop College, "Highlights of the E. B. A. Convention at Berea"; William S. Price, "Activities of the E. B. A." At the Saturday morning session, C. M. Hill presided. Subject: "Significance of Education and Institutional Cooperative Service."

## DECEMBER 3

**Allentown**—Annual dinner dance of the **Lehigh Valley Association**, at the Americus Hotel. The committee in charge consisted of G. M. Overfield of Bethlehem, *Chairman*, assisted by H. R. Chidsey, J. Carcione and R. C. Schaeffer of Easton, B. C. Sawyer of Bethlehem, R. McLaren, F. W. Romig and T. C. Neil of Allentown, and J. A. Nark of Catasauqua.

**Portland**—Meeting of the **Oregon Association**. H. C. Dekker of the advertising and sales department of Gilbert Brothers spoke on methods of arriving at a selling price.

## DECEMBER 6

**San Francisco**—Dinner meeting of the **Northern California Association**, at the 365 Club Annex. Discussion conducted by the Educational Committee, on "Buying the Proper Quality." A similar meeting was conducted by the East Bay Group of the Association at the same time, at the Coit Hotel, Oakland.

## DECEMBER 7

**Oakland**—Luncheon meeting of the **East Bay Group, Northern California Association**, at the Lake Merritt Hotel. Sound motion picture, "Seeds of Service," presented by the H. J. Heinz Co.

## DECEMBER 9

**Chicago**—Dinner meeting of the **Chicago Association**, at the Sherman Hotel. Speaker: Albert

Kennedy Roswell, philosopher and humorist, "Laughing at the Clouds."

**San Francisco**—Luncheon meeting of the Northern California Association, at the Palace Hotel. A sound motion picture showing the manufacture of steel wool was exhibited by L. E. Diamond, Jr., of the James H. Rhodes Co., and J. C. Gindraux, engineer, discussed elevated highways as a means of relieving the traffic situation in San Francisco.

**Philadelphia**—Annual meeting and Christmas party of the Philadelphia Association, at the Bellevue-Stratford Hotel. Speakers: Rear Admiral W. T. Cluverius, U. S. Navy, Commandant of the U. S. Navy Yard at Philadelphia, "What the Navy Buys"; Fred H. Swan, Line Coach at Temple University, and R. E. Kinney, football official, "College Football." The following officers were elected for 1938: President, Robert Porter of Provident Trust Co.; Vice Presidents, Harry F. Keeler of James Lees & Sons Co. and Chas. P. Cochrane Co., and Milton L. Draper of E. I. du Pont de Nemours & Co.; Secretary-Treasurer, Ralph E. Frazer of General Accident, Fire & Life Assurance Corp., Ltd.; National Director, P. G. Maguire of Pennsylvania Sugar Co.

**Seattle**—Dinner meeting of the Washington Association, at the Washington Athletic Club. Speaker: Olaf L. Olsen, State Director of Finance, Budget, and Business, "Managing State Institutions."

**Dallas**—Luncheon meeting of the Dallas Association, at the Dallas Athletic Club. Speaker: Ben Critz, General Manager of the Dallas Chamber of Commerce, "Industrial Development of the Southwest."

#### DECEMBER 10

**San Francisco**—Seventh annual X. P. A. party of the Northern California Association, at the St. Francis Hotel. Banquet and entertainment.

**Tulsa**—Joint stag party of the Tulsa Association and the Petroleum Motor Transport Association, at the Mayo Hotel. Harley Pray of the Tulsa Winch Co. was host for the party.

#### DECEMBER 11

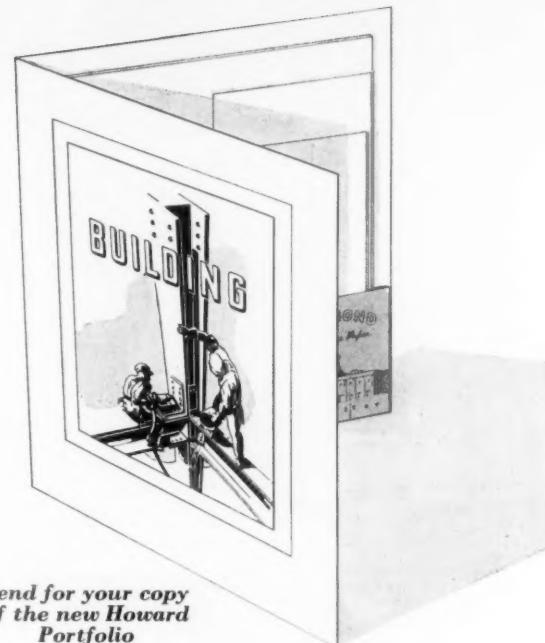
**Cleveland**—Annual Christmas party and dinner dance of the Cleveland Association, in the ballroom of the Hotel Cleveland.

**Tulsa**—Annual President's—Ladies Night dinner dance of the Tulsa Association, at the Tulsa Club.

#### DECEMBER 13

**Boston**—Annual Christmas party of the New England Association, at the Statler Hotel. J. A. Roche was general chairman of the committee.

JANUARY 1938

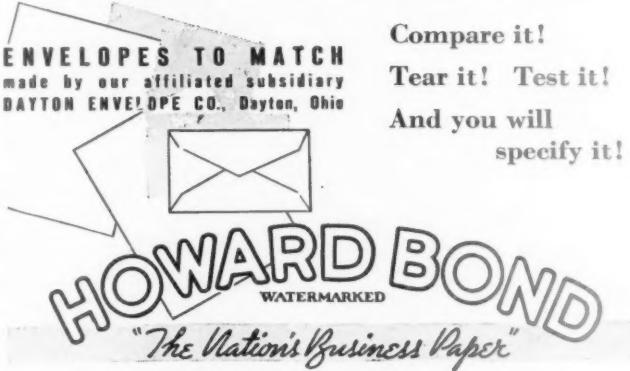


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**Wyomissing, Penna.**—Meeting of the **Reading Association**, at the Iris Club. J. J. Tighe of the Glen-Gery Shale Brick Company described "How Bricks Are Made," and Frank H. Carter of Baltimore, District Vice President, spoke on National Association affairs.

**New Orleans**—Dinner meeting of the **New Orleans Association**, at Kolb's Restaurant. Speaker: Grant Clark, "Manufacturing Labor Cost Rates." Plans were initiated for the holding of an industrial products exhibit during 1938, and the following committee was appointed: Rene H. Garrot, E. G. Clark, and Walter B. Eagan.

**Columbus**—Dinner meeting of the **Columbus Association**, at the Athletic Club. Guest speakers: District Vice President J. E. O'Brien and A. G. Hopcraft of Cleveland.

**Portland**—Dinner meeting of the **Oregon Association**. Speaker: Don Ross, credit manager of the Irwin-Hodson Co., "Use and Abuse of Credit."

#### DECEMBER 14

**Saginaw**—Annual meeting of the **Saginaw Valley Association**. The following officers were elected for 1938: *President*, John E. Thompson of Dow Chemical Co., Midland; *Vice President*, E. L. Reichle

of Reichle Supply Co., Saginaw; *Secretary*, Thomas L. Plater of Flack Pennell Co., Saginaw; *Treasurer*, Edward Harris of Bay City; *National Director*, George H. Fluehr of Kuhlman Electric Co., Bay City; *National Convention Chairman*, T. M. Warren of Morley Bros., Saginaw.

**Oakland**—Luncheon meeting of the **East Bay Group**, Northern California Association, at the Lake Merritt Hotel. Talk on "The Manufacture of Serums," by a representative of the Cutter Laboratories of Berkeley.

**Tulsa**—Annual meeting of the **Tulsa Association**. The following officers for 1938 were elected: *President*, M. F. Bridges of Tide Water Associated Oil Co.; *Vice Presidents*, H. P. Hellinghausen of Oklahoma Pipe Line Co., and T. C. Haller of Sun Oil Co.; *Secretary-Treasurer*, C. D. Taylor of Barnsdall Oil Co.; *National Director*, C. M. Taylor of Indian Territory Illuminating Oil Co.; *Executive Secretary*, H. M. Cosgrove; *Assistant Secretary*, E. R. Welch. A colored motion picture was shown on "Vapor Lock and Vapor Losses in 1937 Motor Cars."

**St. Louis**—Annual meeting of the **St. Louis Association**, at the York Hotel. Speaker: Joseph W. Nicholson, City Purchasing Agent at Milwaukee and District Vice President of N.A.P.A., "Govern-

mental Purchasing and Its Relationship to Industry." The following officers were elected and installed to serve during 1938: *President*, Wm. Grossman of A. Leschen & Sons Rope Co.; *Vice Presidents*, Wm. G. Smith of James R. Kearney Corp., and Herbert De Staebler of Lambert Pharmacal Co.; *Secretary*, W. C. McCaslin of Phelan-Faust Paint Mfg. Co.; *Treasurer*, George H. Brown of Century Electric Co.; *National Director*, Lee J. Bussman of Bussman Mfg. Co.; *Executive Committee*, L. P. Heneghan of Fulton Bag & Cotton Mills, Irving C. Peppel of General Metal Products Co., and J. J. Sharkey of Western Cartridge Co.

**Milwaukee**—Dinner meeting of the Milwaukee Association, at the Elks Club. A sound motion picture was shown, depicting the refining of secondary non-ferrous metals, with explanatory remarks by Messrs. Romanoff and Thieme of H. Kramer & Co. Round table discussion on the relationship of the purchasing department with engineering and pattern departments.

**Vancouver**—Annual Christmas party of the British Columbia Association, at the Vancouver Hotel.

**Akron**—Annual Christmas party of the Akron Association, at the University Club. K. H. Suder was chairman of the committee in charge.

#### DECEMBER 15

**Detroit**—Dinner meeting of the Detroit Association, at Webster Hall. Speaker: Attorney C. M. Youngjohn, "Michigan's Use Tax."

**Canton**—Annual Christmas party and "Gridiron" dinner of the Canton & Eastern Ohio Association, at the Elks Club.

**San Diego**—Family Christmas party of the San Diego Association, at the U. S. Grant Hotel. The program was provided by the children.

**Indianapolis**—Christmas dinner dance of the Indianapolis Association, at the Columbia Club. The committee on arrangements included Robert C. Burnett, *Chairman*, Frank C. Thompson and George C. Mercer. With more than 350 members and guests attending, it was the largest event ever sponsored by the Association.

#### DECEMBER 16

**San Francisco**—Annual Christmas stag luncheon and entertainment of the Northern California Association, at the St. Francis Hotel.

**Rock Island, Ill.**—Public meeting of the Tri-City Association, at the Fort Armstrong Hotel. Speaker: Joseph W. Nicholson, City Purchasing Agent for  
*Continued on page 58*



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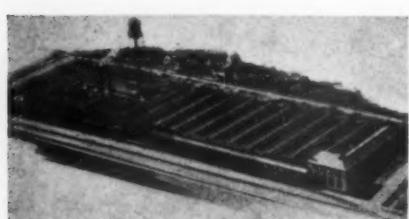
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# **PERSONALITIES in the NEWS**

HARRY MILLER has been appointed purchasing agent for Electrical Products, Consolidated, Seattle, succeeding ATHOL BAKER, who has resigned to become assistant manager of the Agnew Hardware Co., Everett. Mr. Miller has been storekeeper for the company since 1934, and prior to that time was buyer for the Dohrmann Hotel Supply Co.

HARRY F. KOLB of San Francisco has been appointed Director of Purchases for the Hercules Powder Co., with headquarters at Wilmington, Del., succeeding R. B. MCKINNEY, who has been transferred to other duties. Mr. Kolb was formerly assistant purchasing agent of the California Powder Works of the Du Pont company, and became western purchasing agent of the Hercules Powder Company at the time of its formation in 1918, relinquishing his purchasing duties in 1932, when he was placed in charge of western sales for the company. In 1935 he became assistant manager of the San Francisco office. He is a charter member and past president of the Northern California Purchasing Agents Association.

HUGH H. MEEHAN has retired as purchasing agent for the A. B. Dick Co., Chicago, after 36 years of service with that organization. Mr. Meehan was active in the formation of the Chicago Purchasing Agents Association, and was president in 1917. He has also been active in the Chicago Chamber of Commerce and the Illinois Manufacturers Association. He will make his residence in Florida.

H. E. LONG has been appointed Director of Purchases for all divisions of Nash-Kelvinator Corp., with offices at the Kelvinator factory, Detroit. Mr. Long was formerly vice president in charge of purchases for Nash Motors.



**T. D. JOLLY**

THOMAS D. JOLLY, Purchasing Agent for the Aluminum Company of America at Pittsburgh since 1931, has been appointed Chief Engineer and Director of Purchases for the company. He now has under his direction the purchasing department and all engineering in the company except electrical and hydraulic. Mr. Jolly has been associated with the Aluminum Company for 22 years, and was active in engineering work for 14 years prior to his purchasing assignment, serving as draftsman, master mechanic, superintendent of maintenance and mechanical superintendent at various plants. RALPH O. KEEFER, formerly assistant purchasing agent has been appointed purchasing agent, and will report to Mr. Jolly.

JOHN J. CONN has been appointed General Purchasing Agent of the Atchison, Topeka & Santa Fe Railroad, succeeding the late M. J. Collins. Mr. Conn has been in the Santa Fe purchasing department since 1889, when he got his first job as office boy. He has been Assistant General Purchasing Agent since 1910.

T. L. HEWETSON has been appointed purchasing agent of the Lancaster, Ohio, School Board.

S. A. HAYDEN, general storekeeper of the Missouri-Kansas-Texas Railroad at St. Louis, has been ap-

pointed assistant purchasing agent in addition to his former duties. WILLIAM F. NIEHAUS, formerly assistant to the purchasing agent, has been named fuel agent at St. Louis.

G. W. LEIGH, Purchasing Agent of the Minneapolis, St. Paul & Sault Ste. Marie Railroad, at Minneapolis, has taken over supervision of the stores department as well, and now has the title of Purchasing Agent and General Storekeeper. J. B. NOYES, formerly general storekeeper, is now Assistant Purchasing Agent and General Storekeeper.

CAPUS M. WAYNICK has resigned as Director of the North Carolina State Division of Purchase and Contract to resume the editorship of the High Point (N. C.) *Enterprise*, a post he relinquished four years ago to enter the public service. State Senator J. BENTON STACY of Ruffin, Rockingham County, has been appointed to succeed Mr. Waynick.

WARD ALEXANDER has been appointed Assistant City Purchasing Agent at Schenectady, N. Y., effective January 1.

## Obituary

ROBERT A. MATTHEWS, 66, died at Christ Hospital, Cincinnati, November 19th. He had been associated with the National Lead Co. for forty-one years, and served the company as purchasing agent.

OSCAR E. LINDEMANN, 44, died at the Deaconess Hospital, Milwaukee, December 20th, of injuries resulting from a fall on an icy ramp a few hours previously. Mr. Lindemann was purchasing agent and director of the A. J. Lindemann & Hoverson Co., stove manufacturers, and was one of four brothers active in the management of the business.

EDWARD P. McCARTHY, 41, died at the Rome (N. Y.) Hospital, December 24th. He was purchasing agent for the Rome Grader Co.

## Better Light with NEW G-E SILVERED BOWL MAZDA LAMPS



The tire building department in Dunlop's Buffalo plant showing the main lighting installation with 500-watt G-E Silvered Bowl MAZDA lamps.

## DUNLOP TIRE AND RUBBER CORP. PLANT STARTS LIGHT CONDITIONING

The Dunlop Tire & Rubber Corporation in Buffalo recently light conditioned its tire building department, using 500-watt G-E Silvered Bowl MAZDA lamps. The new lighting provides four to five times more light than the old system and gives employees the right kind of lighting for Seeing and Comfort . . . wherever eyes are used.

Important to the success of any relighting program is the use of good lamp bulbs . . . such as G-E MAZDA lamps, the kind that *Stay Brighter Longer* and give full lighting value for your money. Next time you buy lamp bulbs, follow the example of thousands of purchasing agents . . . the men who buy bulbs for the outstanding industrial and commercial concerns, great railroad systems, and public utilities . . . and specify G-E MAZDA lamps. General Electric Company, Dept. 166, Nela Park, Cleveland, O.



### USE A G-E LIGHT METER TO MEASURE PLANT LIGHTING

The General Electric Light Meter measures light as simply as a thermometer measures temperature. It tells whether the various departments in your plant are getting enough light for safe seeing. Order one today. Costs only \$11.50.



**GENERAL ELECTRIC**  
**MAZDA LAMPS**

G-E Silvered Bowl MAZDA lamps are regular MAZDA lamps with a coating of "mirror" silver on the bowl.

**NEW**

## RECORD-KEEPING EFFICIENCY . . .

MOORE'S Loose Leaf Binders and Record Sheets will help you keep your records more conveniently, more economically. Simple and accessible. A great number of sheets may be safely held in small space. Sheets may be removed instantly without disturbing others. Pages easy to transfer. Held in perfect security and alignment.

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140 Pages!

ELLIS H. MORRELL, 40, died at the Lee Hospital, Johnstown, Pa., December 5th. He had been in poor health for several months. Mr. Morrell had been associated with the National Radiator Corp. since 1921, and served as purchasing agent since 1934.

JOHN FERRICK, long time purchasing agent of Ira Bushey & Son, shipbuilders, died at his home in Brooklyn, N. Y., December 9th, after a lingering illness.

JOHN B. MORROW, 60, died of a heart attack at his home in Wilmington, Del., December 13th. From 1902 to 1934, Mr. Morrow was purchasing agent for the Edge Moor Iron Co., and later was purchasing agent for W. K. Mitchell & Co., Philadelphia. He was district supervisor of the Census of American Business and Manufactures in 1936.

## Food Statistics

(Continued from page 19)

vegetables, fell several million cases short of the predictions of spring and summer. The 1937 pack of Alaskan salmon was about 6,500,000 cases, or "normal," as against last year's pack of 8,200,000 cases, an all-time record.

The 1937 California peach pack was the largest since 1930, when 13,200,000 cases were packed. Clever advertising, aggressive merchandising by chain stores, corporate and voluntary, the resourcefulness of wholesalers, jobbers and independents and the increase in number and effectiveness of supermarkets have stimulated consumer response to the point where canned foods are being consumed as never before in the face of competing lines, frozen or fresh.

An important source of food statistics is the Bureau of Agricultural Economics, which issues elaborate monthly reports on prices and conditions. Moreover it invariably predicts the future, which is of course unique for Governmental agencies and bureaus which usually deal only with by-gones and in some cases with events long in the past.

Moreover, its predictions have been uncannily accurate.

Thus this bureau recently has forecast that the annual production of all fruits during the next five years will be larger than the average for 1932-1936. In its November report it stated that production, demand and prices of fruits may rise and that a reduction of vegetable acreage is advised.

In its December report it noted that prices of cattle declined sharply in November after having reached the highest level in sixteen years

## 23rd Annual Convention National Association of Purchasing Agents St. Louis... May 23-26

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### Flexible BELT LACING

STEELGRIP is a stronger lacing for all power and conveying belts. Clinches smoothly into belt, compresses ends, prevents fraying. 2-piece hinged rocker pins prevent excessive wear. In boxes or long lengths.

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"The Belt Lacing People"

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**QUALITY**  
**ABRASIVES**

TRADE MARK

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Refiners and Makers  
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**FLOURS**

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during October. It predicts that the number of cattle fed this winter will be much larger than last season. It also suggests that the decline in farm commodity prices may have been checked. Its index figure for November was 107, the lowest since the summer of 1936. The Bureau's predictions, all prepared and delivered to the consumers' doorstep, so to speak, are very handy for him who would conserve his gray matter for use on other problems.

The Bureau's prices and index number appear once a month. For him who would have a more frequent index there is the New York *Journal of Commerce*, which every Monday compares prices of twenty-two food groups with the week before, month before, and year before. In fact, of its several groups of commodities, listed weekly, foods comprise the longest list, including vegetables, fruits, fish, meats, dairy products, etc.

The *Western Canner & Packer*, San Francisco, is quite a pretentious trade journal in its field, and seems to be regarded as a Bible of the canned food field. Each year sees some new item of food canned. Canned turkey is new. Canned rattlesnake meat is a delicacy which many do not question. Canned new potatoes appeared not so many years ago.

The canning of juices is an important development of recent years. Thus through the canning of pineapple juices, the total pineapple pack has been doubled to 20,000,000 cases annually. The canning of grapefruit, through the addition of juices, has increased the total pack many times. The tomato canners now pay more attention to juices than to stewed tomatoes. The man of today prefers to drink his breakfast rather than to eat it.

On December 20, to be exact, the United States Department of Agriculture announced that for the first time it was compiling figures on American production of garlic. Heretofore, apparently, all garlic has been imported—all garlic officially recognized, at least. On the strength of that we close this article.

## "THE GOAL GETTER"



The letter writer in business carries the message of his concern across the field of competition, couched in the well-chosen words and phrases of his profession.

If his message "touches" his reader, the goal of good business is the result.

### MILLER LINE INKED RIBBONS CARBON PAPERS STENCIL INKS

run interference for the business correspondent. Bright, snappy typings cheer the reader the moment the envelope is opened.

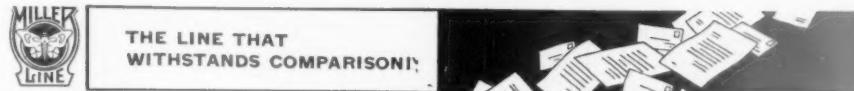
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Purchase Records, Quotation Records and Perpetual Inventories are among the most active and most valuable records of an organization. For this reason, they should be maintained in Visible Record Binders for quick reference and protection against loss.

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## THERE IS NO SUBSTITUTE FOR EVEN CORROSION!

**I**F the grain structure of an anode is uneven and impure, faulty corrosion results—with slow plating action, poor plate and much "sludge." Often such anodes pit so deeply they break in two. They always prove expensive.

**SEYMOUR "Controlled Grain"** Anodes are noted for smooth, even corrosion. This is explained by the fact that they are made of virgin nickel, melted in a modern electric furnace under strict pyrometric control and laboratory check. They are made for the plater who wants to show a profit! Anode Book on request.

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**SEYMOUR**  
**NICKEL ANODES**

PAGE 52

### Bert Downey

(Continued from page 22)

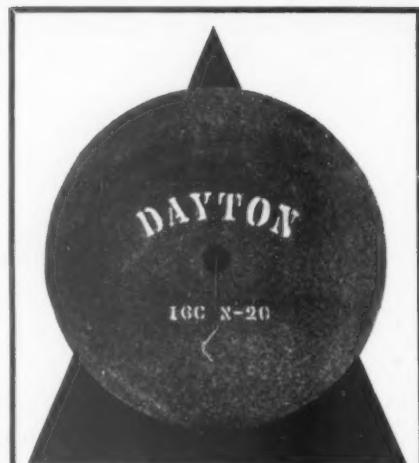
never used the association for the furtherance of any personal business, and the propriety of his continuing membership has never been challenged.

He is a frequent attendant at national conventions, and his presence has added both to the gaiety and the business accomplishments of those meetings. At a recent meeting of Sixth District members in his city, he was host to the entire gathering at a dinner meeting. But it was done without fanfare or previous announcement. Bert got a chuckle of satisfaction from providing a pleasant surprise for his friends.

**A**NOTHER OF HIS ENTHUSIASMS has been the Masonic fraternity. In this activity he has had some rather unusual experiences, and it has played an exceptionally important part in his life.

The order had a great appeal to him as a young man, and one of his earliest ambitions was to become a member. He entered the lodge on the day following his twenty-first birthday. The step was violently opposed by his family, for a reason that he learned only after several years had passed. One of his grandfather's brothers had been forced out of the ministry for joining the fraternity, because of some supposed conflict between the two, and as a result of the unfounded prejudice arising from this unfortunate incident of a former generation no other member of the family had identified himself with Masonry since that time. It was a dark secret, and the church was given the benefit of the doubt. When Bert eventually learned of the situation, he declined to make an issue of it. But the force of his own experience in fraternal work was the most potent argument. Fourteen years later, as Master of St. Andrew's Lodge of Springfield, he had the unique privilege of going back home and conferring the work upon his own father in the very lodge where he had received his degrees.

In 1916, he was in charge of the Springfield delegation attending a



## DAYTON GRINDING WHEELS

Regardless of your requirements, you can obtain a Dayton abrasive wheel of the exact specifications the work demands. On the market for years and the preference for a wide range of operations. Write

**The Simonds-Worden-White Co.**  
Dayton, Ohio  
FACTORIES AT: Dayton, Cleveland,  
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## COILED WIRE SPRINGS

### Wire Form Specialties



PURCHASING

State Knight Templar Conclave at Tiffin, Ohio. Through a friend in that city, he had undertaken to arrange proper introductions for the visiting Knights, so that they might have young lady partners for the ball and other social features of the gathering. It was a thoughtful gesture, and enthusiastically welcomed by both parties. The plan was carried out in a business like fashion. On his arrival, Bert was handed a pack of neatly typed cards to distribute among his delegation. There were exactly enough to go around, and he found himself with just one card remaining. That was his introduction to Miss Minnie Baltzell. She proved to be a most charming and congenial partner. A year later they were married.

The Downeys have one daughter, an attractive miss of eighteen years, now in her senior year at Stephens College, Columbia, Missouri. Betzy Jane (a spelling adapted from her Grandmother Betz's family name) has evidently inherited her father's talent for popularity and leadership, for in addition to active participation in school activities, she has been elected vice president of North Hall at Stephens.

A further indication of the extent of his fraternal ties and the general esteem in which he is held, is the fact that his office walls are hung with certificates of honorary membership in every Shrine temple in the State of Ohio, as well as from Lexington, Ky., St. Louis, Sacramento and San Francisco.

Bert Downey is representative of what we like to think of as the self-made American. Successful, self-reliant, but thoroughly unassuming, he is and always will be a worker—and a worker with others. He takes off his coat when he gets to the office, and the office door stands open. He has a varied and lively interest in the affairs of the world about him, and is ready to express that interest in terms of service. A straight and serious thinker, he hasn't taken himself too seriously. His friends of yesterday are his friends today; his friends of today will be his friends of tomorrow—and many, many more.

—S. F. H.

## NATIONAL IMPROVED BI-LOCK SECTIONAL POST BINDERS

TWO FEATURES . . . BUTTON-LOCK AND KEY-LOCK IN ONE BINDER



### For Convenience

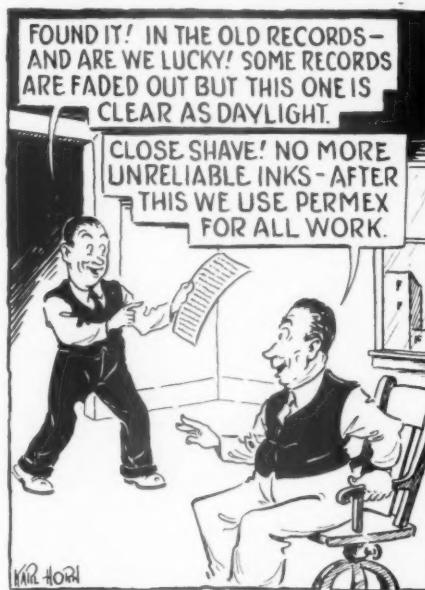
When binder is being used for current use and sheets are being frequently inserted or removed, it can be easily unlocked or locked by a slight touch of the button.

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When it is necessary to lock the binder against unauthorized removal of sheets, it can be locked with a quarter turn of the individual key furnished with the binder.

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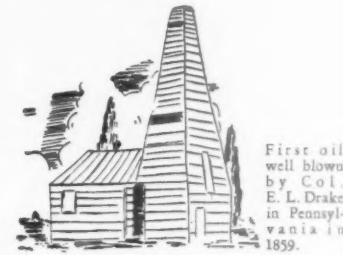
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Will withstand age, exposure to light and water. Your records are safe with PERMEX, the high quality, economical, all-purpose ink.

FREE! Send for trial bottle, folder and prices.

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was blown in this country

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were being supplied to industry and considered then, as today, the most dependable product of its type.

Specify the brand that did pioneering

**CLARK BROS BOLT CO.**  
MILLDALE, CONN.



# NEW PRODUCTS & IDEAS



## BELT LACER

No. 529

THIS VISE TYPE lacer weighs only three pounds, and has the advantage of portability, especially useful in small shops, construction projects or other outside work, and in remote sections of a plant. It is equipped with feet that permit it to stand steadily in a loading position on any flat surface, and thin blade shears that go between hooks and cut cards to exact length are conveniently attached. It operates in any standard bench vise and will handle belts up to six inches in width at one operation.

*Use coupon below*



## UNIT STORAGE RACK

No. 530

INDIVIDUAL RACKS OF channel and formed steel, strongly welded, are designed so that they interlock, one on top of another, to form a rigid unit. Each rack takes a shop box or

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tote pan, which is free to move as a drawer when the rack is assembled, thus making each box and its contents readily available as required, regardless of the height of the stack. The units are completely flexible as to arrangement, and can be set up, disassembled and moved without the use of tools, and consequently a storage rack of any size or shape can be put together in the storeroom, on the production line, or adjacent to benches and machines, to suit the particular requirements of space and convenience.

*Use coupon below*

## WIRE ROPE SLING

No. 531

BUILT TO SPECIFICATION as required, these braided wire rope slings are formed by two endless ropes, one right lay and one left lay, looped upon each other to form a 16-part braid over a manila core. This construction is exceedingly safe and flexible. It has no tendency to kink, and the ends of the rope form natural eyes at both ends, which are held in formation by means of thimbles. The resulting sling can be used either in basket hitch or choker hitch, and will handle loads of from one to three hundred tons.



*Use coupon at left*

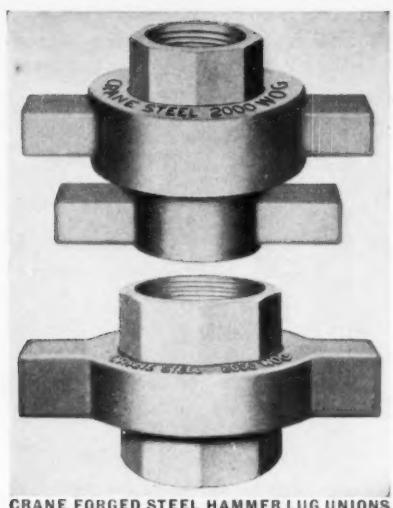
## WORK TABLE



No. 532

ADJUSTABLE FOR HEIGHT from 24 to 38 inches, this new portable elevating work table is designed to provide maximum convenience for the operator at a machine or bench. It has a capacity of 4,000 pounds, and is raised and lowered by means of a ball bearing hand wheel attached to a vertical screw. An electrically driven model has also been developed. The table is 26 inches in diameter, and can be fitted with various shapes or sizes of tops as needed. The support screw can be locked to hold the desired position. The base is supported on three casters and is so arranged that the weight can be taken from two of these points when the table is being used in a stationary position.

*Use coupon at left*



### PIPE UNION

No. 533

ILLUSTRATED ARE TWO new steel forged pipe unions fitted with lugs that enable the pipe fitter to loosen or tighten a joint with a hammer. The double-lug union is made of forged steel in three sizes from  $\frac{3}{8}$  to  $\frac{3}{4}$  inch. The single-lug type, with a pair of lugs on the locking nut only, is made in sizes from 2 to 4 inches, the 4-inch size being made of cast steel.

Use coupon page 54

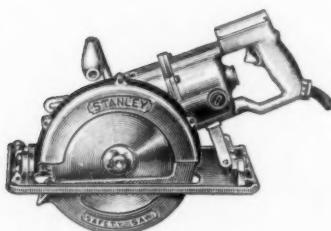


### SAFETY GOGGLES

No. 534

REINFORCED PLASTIC construction of these new goggles has successfully overcome objections heretofore considered inherently common to all molded goggles. By casting plastic material around an accurately formed, perforated monel skeleton, the product has been made stronger, lighter and less bulky, resulting in greater comfort, appearance and utility. Generous, unrestricted air vents adjacent to the nose as well as in the outside position provide cooling cross ventilation and permit a wide range of vision. The nose bridge is quickly adjustable, the eye cups anatomically correct, and the head band is of an oil resisting rubber compound.

Use coupon page 54

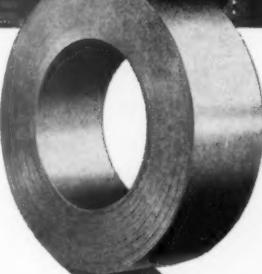


### PORABLE ELECTRIC SAW

No. 535

THIS PORTABLE SAW OPERATES on d.c. or a.c. at 60 cycles or less and at 110 or 220 volts, drawing 11 amperes on full load at 110 volts. Total weight is 26 pounds, and speed of the saw is 3,300 rpm at no load. It is mounted on a tilting base which can be set at any angle between square and 45 degrees. The base is slotted, enabling the operator to follow a line. Control is by means of a trigger switch in the handle, and depth of cut is adjustable. The upper half of the saw guard is stationary,

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THOMAS STEEL



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Wherever you go . . . wherever you may be, there is a product near by that has in it Thomas Cold Rolled Strip. The reason for this is that manufacturers have found that Thomastrip offers distinct money and time saving advantages in that it can be had in special finishes. The Thomas Steel Company with their sales and production departments right at the mill afford immediate answers to your production problems. Do as others do, use Thomastrip for your product.

THE THOMAS STEEL CO. Warren, O.  
Specialized Producers of Cold Rolled Strip Steel



YOU BUY for both economy and efficiency when you order BOSTON Pencil Sharpeners. The Model KS shown here, has exclusive design pencil guide for all pencil sizes. Equipped with solid speed cutters—lasting 25% longer than ordinary sharpeners. Lists \$1.75.

ORDER  
TODAY

### ASK YOUR SECRETARY...

She knows the convenience and efficiency of Boston Service. There's a model Boston Pencil Sharpener for every office and shop need.

*Boston's Cut—They Never Scrape!*



## BOSTON PENCIL SHARPENERS

A product of the Hunt Pen Co., Camden, N. J.

### GEARED

*to meet the urgent demands  
OF YOUR PRODUCTION LINE*

Consider these points when you look for a dependable source of spring parts:

INTELLIGENT HANDLING OF SPECIFICATIONS  
PROMPT, CERTAIN ACTION IN TOOLING UP  
DELIVERIES TO MEET YOUR PRODUCTION  
UNIFORM QUALITY FROM START TO FINISH  
ONE SOURCE OF SUPPLY FOR MANY PRODUCTS  
EFFICIENT PLANNING FOR GREATEST ECONOMY

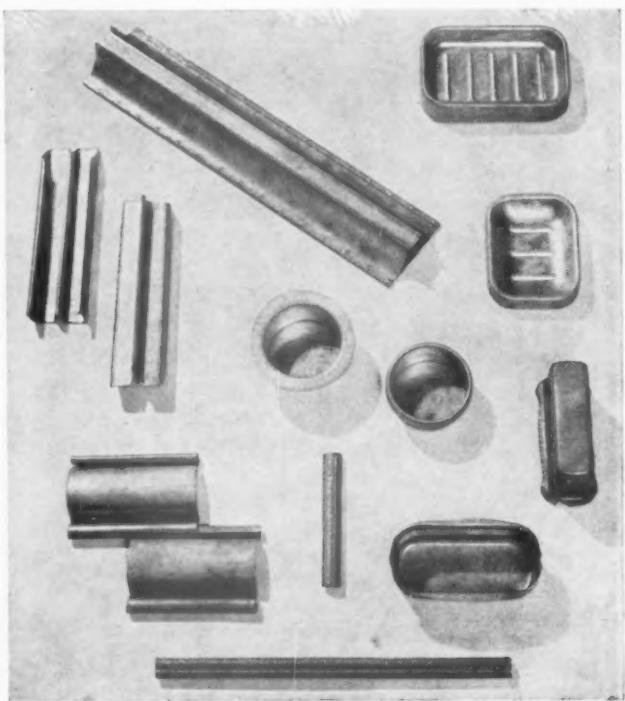
Controlled quality from steel to finished part is Barnes' answer to the day's demand for production and still more production. A modern steel mill owned and operated by Barnes is capable of producing stock for almost any requirement, every day. Large amounts are always on hand for quick conversion into the kind of spring you need.

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DIVISION OF ASSOCIATED SPRING CORPORATION  
SPRINGMAKERS FOR MORE THAN THREE QUARTERS OF A CENTURY

**Barnes-made SPRINGS**

but the lower half is so mounted that it uncovers the cutting edge as the saw is advanced, but returns to cover the blade as soon as a cut is finished. A combination saw blade is standard equipment; optional equipment includes ripping blade, cross-cut blade, combination miter blade, and a metal cutting blade.

Use coupon page 54



### GALVANIZED SHEET METAL No. 536

A NEW GALVANIZED sheet metal has been developed, carrying from 59 to 75% more zinc than tight-coat sheets generally used for fabricated products, and capable of being drawn or formed without breaking the galvanized coating loose from the base metal. Representative parts shown in the illustration indicate its wide range of application. It is available in 16 to 28-gauge thickness and in a variety of basic grades of iron and steel, sheet and strip.

Use coupon page 54

### HEAVY DUTY CONTROL STATION



No. 537

THIS NEW LINE OF heavy duty control stations for machine tool application is provided in both surface and flush mounting types. The units have a maximum d.c. rating of 2.5 amperes, 115 volts; 1.25 amperes, 230 volts; 0.25 amperes, 550 volts; maximum a.c. rating of 10 amperes, 110-220-440-550 volts. The push button mechanism is of unit type construction and can be mounted in combinations of one to ten buttons.

These units have a set of normally open and a set of normally closed double-break silver alloy contacts. Two-way and three-way selector switches and pilot lights use the same base and are interchangeable with the push buttons. Flush mounting stations are available in combinations of one to five units, with adjustable frame so that the standard stations can be used on panels up to  $1\frac{1}{4}$  inches. An extra long shank can be supplied on the button for use on panels up to 3 inches. These stations can be arranged for wiring from either the front or the back. Wiring is convenient and accessible for inspection on both types.

*Use coupon page 54*



### COMPOSITION MALLETS

No. 538

SPECIAL SOLID COMPOSITION used in this line of mallets has done away with metal parts and loading, and permits a wide range of weights without increase in size. Other advantages of this type of construction are the toughness and durability, perfect balance, resistance to oil, water and acids, insulating qualities, and the fact that the heads will not flare, chip or become spongy. The mallet heads can be machined to special shapes or altered with knife, saw or file to fit special needs. Available in four sizes, affording a wide range of weights. The smallest size has  $7\frac{3}{4}$  inch handle and  $1 \times 2\frac{1}{8}$  inch head, weight either  $1\frac{3}{4}$  or 3 ounces. The largest size has  $11\frac{5}{8}$  inch handle and  $2\frac{1}{4} \times 4\frac{1}{4}$  inch head, in four weights from 16 to 45 ounces.

*Use coupon page 54*



### FOLDING SHOP BOXES

No. 539

WOODEN SHOP BOXES, sturdily reinforced with rust-proof hardware and provided with metal skids which permit sliding the boxes along the floor without injury, have the additional advantage of a folding design which enables them to be stored flat in a minimum of space or for return after deliveries have been made. This type of box has been in use for some time by the grocery and bakery trade, and the new type construction makes them now available for handling materials in industrial plants and for temporary stockroom bins as they can be stacked on each other in stable arrangement.

*Use coupon page 54*

CUT YOURSELF A  
SLICE OF PROFIT  
with the  
*Paper Blade*  
THAT CUTS  
YOUR COSTS!

"That he who cuts may cut well"

**LORING COES COMPANY**  
Established 1830  
**MACHINE KNIVES**  
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Craftsmen in the art of paper making  
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**Modern, completely-equipped SHOPS, latest machinery and Expert Welders are your assurance of satisfaction every time you give us a job of HEAVY WELDING**

Write for Data.

**S. MORGAN SMITH Co.**  
YORK PENNA.

## VIBROMETER



No. 540

**M**EASUREMENT OF THE AMPLITUDE of vibration of structural or machine members is accomplished by this device, which operates simply by holding the needle point against the vibrating part. The vibrating motion of the spindle is transmitted directly to the pointer, which appears as bright yellow against a black background. The pointer appears in a double image to the eye of the observer, and the apparent intersection of the two images, read on a scale on the background, gives a direct reading of the vibration amplitude in thousandths of an inch. The instrument is heavy (2 pounds) to avoid inertia effects during use. The range is from .001 to .030 inches, but it is so constructed that no damage will result if it is applied to vibrating members of greater amplitude.

*Use coupon page 54*

### Among the Associations

(Continued from page 47)

Milwaukee, and District Vice President of the N.A.P.A., "The Value of Centralized Purchasing."

**Syracuse**—Annual Christmas party of the Syracuse Association, at the Onondaga Hotel. George McCaffrey and M. E. Jennings headed the committee in charge of the affair.

**Albany**—Dinner meeting of the Eastern New York Association, at the Fort Orange Club. Speaker: Capt. I. D. Van Meter of the U. S. Army Base at South Schenectady.

**El Paso**—Officers for 1938 have been elected by the El Paso Association as follows: *President*, T. E. Silence of the San Francisco Mines of Mexico; *Vice President*, Stanley Calisch of Lone Star Motor Co.; *Secretary-Treasurer*, Pete Canavan. A three-reel film depicting operations at Boulder Dam was shown through the courtesy of the American Steel & Wire Company.

### DECEMBER 17

**Huntington, W. Va.**—Dinner meeting of the Tri-State Association, at the Prichard Hotel. Round table discussion of "Purchasing Department Relationships in the Industrial Organization."

**Salt Lake City**—Annual Christmas party of the Utah Association, at the Newhouse Hotel. B. F. Devinney of the Liberty Fuel Co. was chairman of the committee in charge.



### Bituminous Coal

**MINES:** Scalp Level, South Fork, Hastings and La Rayne Districts of Penna., and Fairmont District of West Virginia.

**SIZES:** Lump — Egg — Nut — Pea — Stoker — Mine Run—Especially Prepared Coal for Pulverizing.

### CORTRIGHT COAL COMPANY

PENNA. BLDG.  
PHILADELPHIA

ONE BROADWAY  
NEW YORK

### Speedy and Accurate Hand Sawing

is now possible. This revolutionary, heavy duty hack saw frame, drop forged from hard aluminum alloy has changed the entire hack saw picture. Absolutely rigid with machine-type blade holders, it holds an unbreakable, high-speed-edge blade at machine tensions. Double handed grips increase power and accuracy. Improved design applies power below the line of cutting and prevents the blade from sticking in the cut. Try it and you will be satisfied with no other. Your dealer will demonstrate.

**ARMSTRONG-BLUM MFG. CO.**  
"The Hack Saw People"  
5760 Bloomingdale Ave. Chicago, U.S.A.

*Write for Circular*



**Portland**—Annual Christmas luncheon and party of the **Oregon Association**, at the Mallory Hotel.

#### DECEMBER 18

**Chicago**—Fifteenth annual family Christmas party of the **Chicago Association**, at the Sherman Hotel. The committee in charge consisted of E. L. Van Vechten, *Chairman*, assisted by H. E. Anderson, R. D. Barnes, and E. W. Fitzgerald.

**St. Louis**—Dinner dance and Christmas party of the **St. Louis Association**, at the Jefferson Hotel. Bridge and door prizes. Vic Vohsen was chairman of the committee in charge.

#### DECEMBER 20

**San Francisco**—Fourteenth annual Christmas party of the **Northern California Association**, at the Fairmont Hotel. Dinner and entertainment for the whole family.

**Baltimore**—Third annual Christmas feather party and dance of the **Baltimore Association**, at the Lord Baltimore Hotel.

#### DECEMBER 21

**New York**—Dinner meeting of the **New York Association**, at the Builders Exchange Club. Speaker: Dr. Ernest Minor Patterson, President of the American Academy of Political and Social Science, "World Politics and American Business." The meeting was preceded by an afternoon forum on "Mimeograph and Multigraph vs. Printing."

**Pittsburgh**—Annual Christmas party of the **Pittsburgh Association**, at the Pittsburgh Athletic Association. Charles E. Briner of the McKay Co. was in charge of the arrangements.

#### DECEMBER 22

**Rochester**—Annual Christmas party of the **Rochester Association**, at the Rochester Club. A. P. Lapp of the Stecher-Traung Lithograph Co. was chairman of the committee in charge.

\* \* \*

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## "OUR LYON STEEL SHELVING Effects IMPORTANT ECONOMIES" . . .

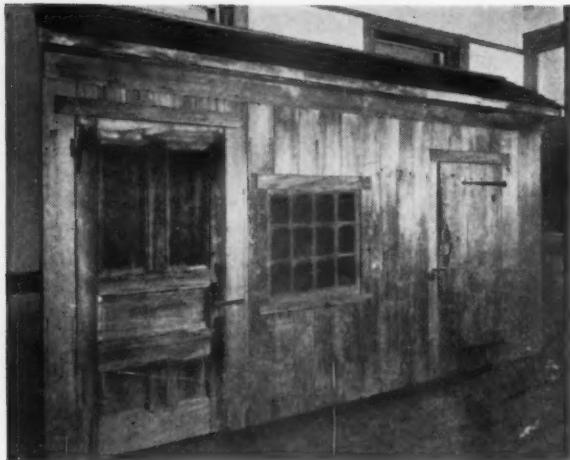
Says Mr. Jack Owens, Purchasing Agent,  
Western-Austin Mfg. Co.



• "Four definite reasons explain our decision to standardize on Lyon Steel Shelving," continues Mr. Owen. "(1) First cost is the last cost. (2) It saves time and floor space. (3) Its complete flexibility enables us to meet constant changes in size and quantities of parts stocked. (4) Time, hard usage and frequent rearrangement do not impair its ship-shape appearance. Our Harvey plant was equipped with Lyon Steel Shelving in 1931. The second installation was made in our Aurora plant in 1935. Two additions since that time have been made at low cost . . . and without interruption to heavy production schedules." Purchasing agents in all types of industry will find it worthwhile to get full details on Lyon Steel Shelving advantages and economies.

LYON METAL PRODUCTS, INCORPORATED  
3301 River Street  
Aurora, Illinois

**LYON**  
STORAGE EQUIPMENT  
*Service*  
LYON METAL PRODUCTS, INCORPORATED, Aurora, Illinois



### Bolt History Was Made Here

A unique and historically important relic of the early industrial life of America is the original building erected in 1840 by Rugg and Barnes of Marion, Conn., which has been authentically identified as the first structure designed and built specifically for the manufacture of bolts and nuts. The building, measuring 30 x 20 feet, housed the entire plant—forging room, packing, shipping, and storage—after the business had outgrown Micah Rugg's blacksmith shop. In succeeding years, it was sold to L. B. Frost & Sons of Marion, another pioneering firm in the bolt industry, served briefly as an ivory and bone button shop, and has for several years been used as a wood shed.

During the period from 1851 to 1886, both Micah Rugg and Martin Barnes were employed by Clark Brothers of Milldale, Conn., one mile from Marion.

The old factory building, weather beaten but still sound after nearly a century, was recently acquired by the Clark Brothers Bolt Co., and the entire front has been reassembled and set up in the office lobby of that modern and extensive plant, with the original batten doors, window, moss-covered boards and hand-forged hardware all intact—a striking contrast of the old and the new, and a reminder of the humble beginnings of an important industry.

## Copper and Copper Alloys

(Continued from page 26)

### 17. Architectural Bronze.

This alloy contains 56% copper, 41 $\frac{1}{4}$ % zinc and 2 $\frac{3}{4}$ % lead and is therefore a brass; not a bronze. It has low ductility and medium strength and high hardness.

It may be extruded and forged and is used for free-cutting extruded shapes; interior ornamental bronze and forgings.

### 18. Silicon Brass.

This is a comparatively recent alloy and is used for special applications where high strength, stamping and electric resistance welding are requisites. It has low thermal and electrical conductivity, the latter being essential to resistance welding. It is finding a field in the manufacture of refrigerator evaporator shells and fire-extinguisher shells. Quite resistant to corrosion.

### 19. Aluminum Brass.

This alloy has found increasing application for condenser tubes. It is very resistant to corrosion and erosion and has what is known as a "self-healing" skin.

### 20. Admiralty Metal.

This is a variation of 70-30 mixture with 1% of tin. It is used primarily for condenser tubes and is quite resistant to heat and salt-water corrosion.

### 21. Naval Brass.

This mixture is a modification of Muntz Metal with  $\frac{3}{4}$ % of tin added. It has good resistance to salt-water corrosion and has many marine applications.

## Bronze

### 22 and 23. Phosphor Bronzes.

These two alloys are typical of a group of phosphor bronzes with tin contents varying from 1.2 to 10%. They have high strength, hardness, resilience and fatigue resistance. They are used for springs, diaphragms, bearings, and miscellaneous small parts. Phosphor bronzes are classed as a refractory alloy. The difficulty of fabricating them makes the cost of manufacture high and consequently their price is relatively high. Some leaded

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**BARNES**  
**BETTER Hack Saw**  
**BLADES**

Barnes Band Saw Blades are hard-edged  
for fast, accurate cutting and long life.  
There's a Barnes distributor near you!

**W. O. BARNES CO., INC. Detroit, Mich.**

phosphor bronze alloys are good for screw machine work.

#### 24. Silicon Bronze.

This class of copper alloys is an extremely useful one. They contain approximately 96% copper, 3½% silicon and ½% tin or manganese.

They combine high strength and excellent physical properties with a high resistance to corrosion comparable with that of copper. They are non-magnetic, they hot work readily and can be welded by any of the standard commercial methods of gas or electric welding. Their thermal and electrical conductivities are low, the latter facilitating electric welding. They can be cold worked and when work hardened can be heat treated to relieve internal stresses without any sacrifice of either strength or hardness and with a distinct increase in elastic limit. They can be spun, stamped, drawn and forged and are furnished in all standard forms including sheet, rod, tube, shafting, welding rod and ingots for sand castings.

Silicon bronze is used for many applications including corrosion resistant tanks, pressure vessels, bolts, screws, lag screws, chain, pipe fittings, etc. An interesting application of the welding rod is the building up of locomotive driving-box hub faces by the electric welding method.

#### 25. Aluminum Bronze.

These alloys contain from 5 to 9% aluminum and 95 to 92% copper. They are a rich golden color, possess high strength and are very resistant to corrosion. They are quite ductile and can be stamped. Their principal use is for condenser tubes.

#### 26. Manganese Bronze.

This alloy is a modification of Muntz Metal containing 59% copper, 39% zinc, 1¼% iron, ¾% tin and a small amount of manganese. It is hard and resistant to wear. It is used for structural purposes, for grille work, coal screens, forgings and welding rod. It can be extruded.

#### Nickel Alloys

#### 27. Nickel Silvers.

These alloys consist of various proportions of copper, zinc and nickel. The copper varies from 45 to 75% and the nickel from 2 to 25%. The 5% nickel alloy is yellow and the color grows lighter as the nickel content increases. The 25% mixture is nickel white.

They are resistant to corrosion and resemble silver somewhat in color.

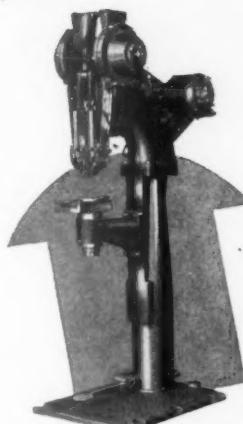
They are used for silver and gold plated articles, extruded shapes, instruments, cutlery and table silver, springs, key stock and interior ornamental bronze.

#### 28, 29 and 30. Cupro-Nickels.

These alloys are straight mixtures of copper and nickel combined sometimes with a small amount of zinc. They are very resistant to corrosion and possess good strength and ductility. Their principal use is for condenser tubes.

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Complete line of automatic riveters for setting up to 4 rivets at a time.

More and more, industry has learned that it pays to take advantage of the engineering service offered by this company. Consultation in the period of assembly design many times results in minor changes permitting lower costs thru standardization, improved service and often economies thru multiple rivet setting. Where this preliminary consultation is not permissible send blue print or preferably sample assembly for production study and analysis involving the use of tubular or split rivets.

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1851 S. 54th Ave., Cicero P. O., Chicago, Ill.

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ONE OF THE WORLD'S LARGEST MANUFACTURERS  
OF RIVETS AND RIVETING EQUIPMENT

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Improved PIPE TOOLS

The most complete line of Pipe Tools made. Standard types, each with many improved design and construction features. Lighter, balanced tools with drop-forged, hardened and alloy steel parts wherever they will add to strength and tool life.

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"The Tool Holder People"  
303 N. Francisco Ave., CHICAGO, U.S.A.



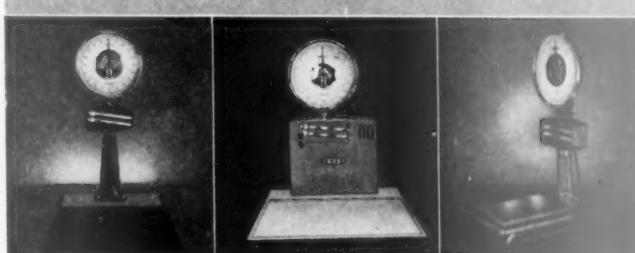
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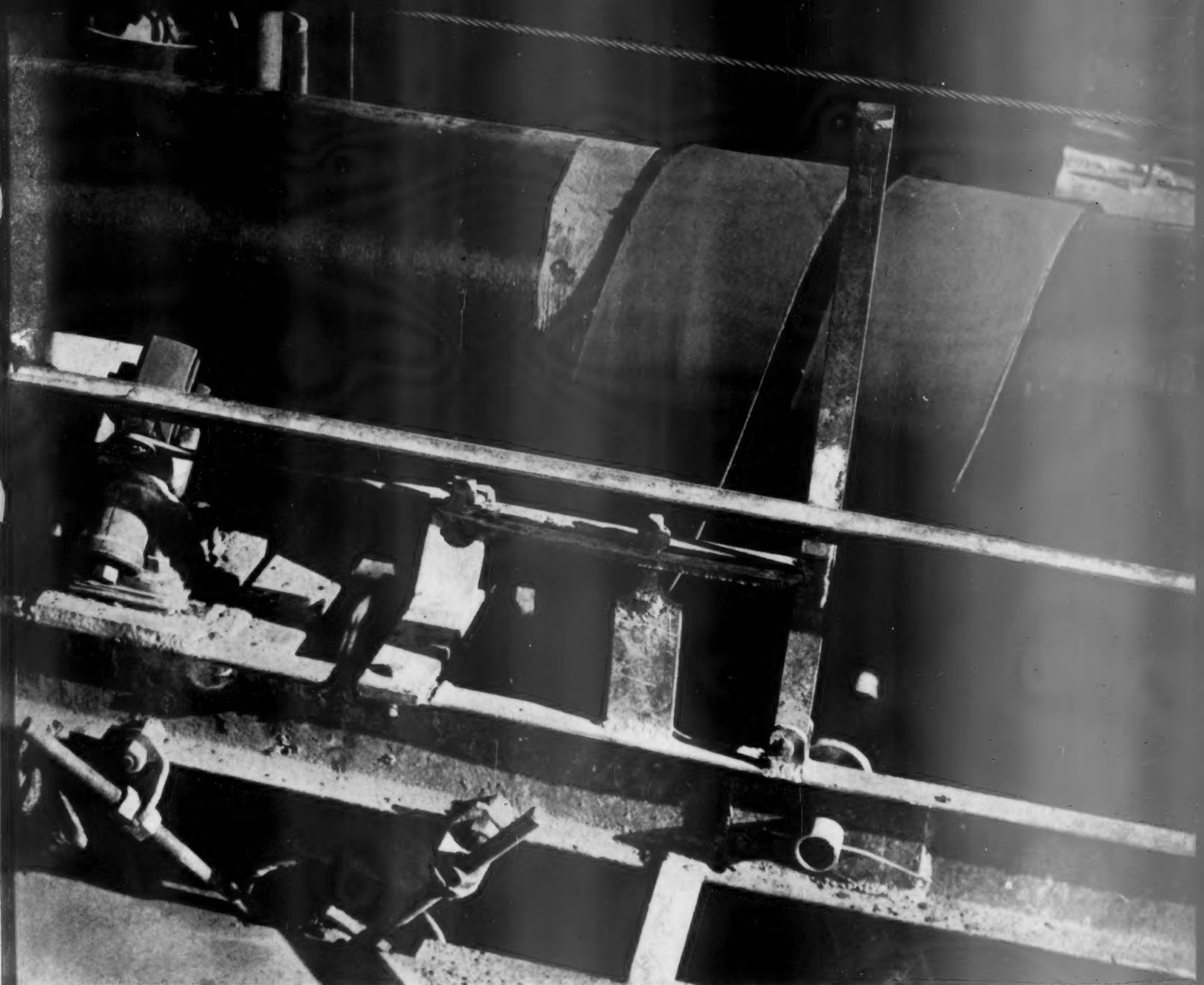
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Technical development makes startling improvements, and Goodrich has applied such development to every industrial rubber product. Modern Goodrich conveyor belts carry more tons than belts ever carried before; hose resists abrasive wear, sunlight, oils,

chemical actions of the various materials handled; rolls and tank linings are made to last almost indefinitely; new rubber products appear month after month, most of them made to fit customer's special requirements and problems. Somewhere in your own plant the extra quality resulting from Goodrich research in rubber can make a saving today. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

**Goodrich**  
ALL *products* *solutions* IN RUBBER

(Another story of Goodrich development work appears on page 1)

# DEFEATS...

## WEAR-CUTTING-WIRE DRAWING



### NEW JENKINS 'ARMOR-SEAT' exceeds 500 Brinell hardness

--makes Jenkins Fig. 976 a dollar-saver in tough services

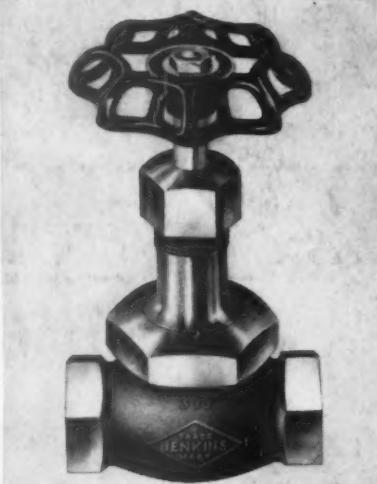
You may not be able to eliminate the causes of wear, cutting and wire drawing of valve seats, but you can free yourself from their effect. You can avoid the trouble, maintenance and replacement expense by installing Fig. 976 Jenkins Plug-Seat Valves on hard duty lines.

Jenkins Fig. 976 has the new Jenkins "Armor-Seat"... made of Jenkins JX500 special alloy steel, exceeding 500 Brinell hardness. It is practically impervious to wear, wire drawing and other valve destroyers. It cannot be cut by throttled steam or harmed by substances which get into pipe lines,

such as pipe chips and boiler scale.

This "Armor-Seat", and Jenkins' extra-quality throughout the valve, makes Fig. 976 as nearly wear-proof, maintenance-proof and trouble-proof as a stock valve can be made. Put this money-saver to work in services such as continuous throttling for pressure reduction; free-blow duty like soot blowers, injectors, heating coils; or close regulation of steam. Ask your supply house, or write for folder and prices on globe and angle patterns for 300 lbs. W.S.P. or 600 lbs. O.W.G.

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#### HOW HARD IS 500 BRINELL?

Nothing that would conceivably get into the valve could scratch Jenkins JX500 special alloy steel seat. Compare 500 Brinell with the hardness of some substances which do get into pipe lines... boiler scale, pipe chips, welding beads, rust tubercles, iron oxides... even with other familiar objects that are softer, such as a common nail which is under 200 Brinell hardness.

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